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HUGHES TOOL COMPANY
HOUSTON, TEXAS
Standard of the Industry

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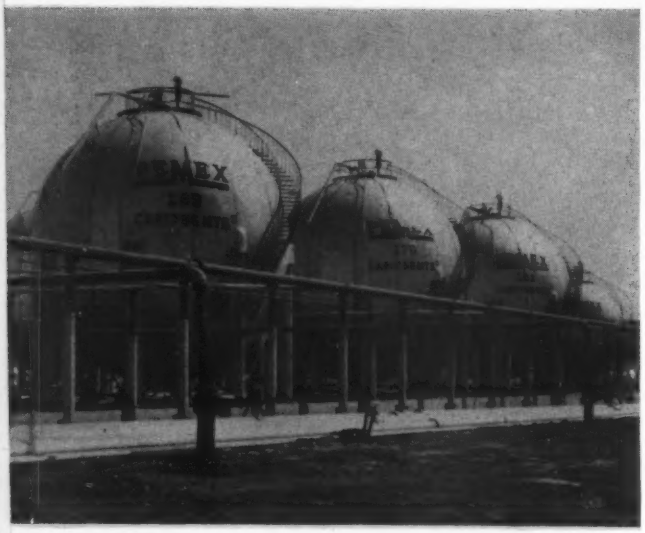
Modern STORAGE FACILITIES



AT TOP: General view of the numerous CB&I tanks at Petroleos Mexicanos' Atzcapotzalco refinery, showing two of the four Hortonspheroids and ten of the Hortonspheres. DIRECTLY ABOVE: Close-up view of some of the Hortonspheres at the Atzcapotzalco refinery.

South of the Border

Petroleos Mexicanos offers a striking example of the way in which modern storage facilities are employed to combat evaporation losses down Mexico way. Numerous Chicago Bridge storage tanks and steel plate work structures are installed at both the Atzcapotzalco Refinery and the Poza Rica topping plant of "PEMEX". There are 12 new Hortonspheres and 4 new Hortonspheroids at these two locations.

Hortonspheroids are recommended for storing motor gasolines and natural gasolines requiring pressures of 30 lbs. per sq. in. or less. They are available in standard capacities up to 120,000 bbls.

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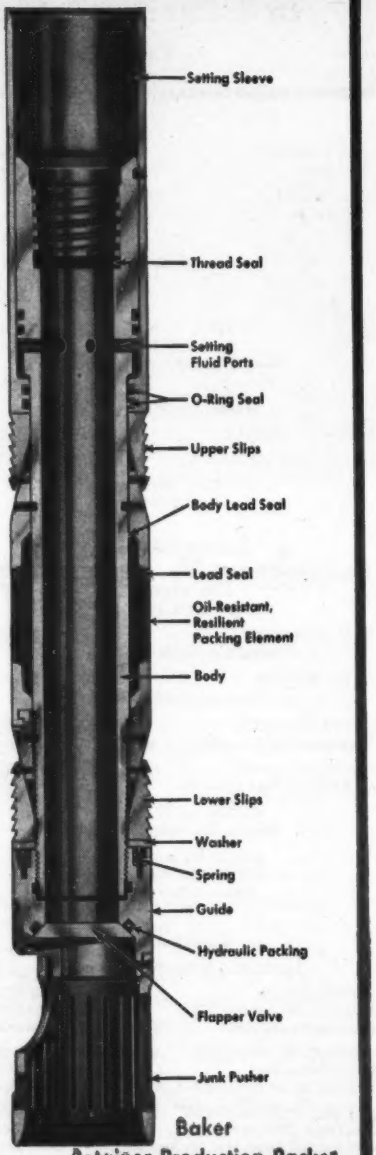

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THE OIL AND GAS JOURNAL

The Job Ahead

TWO week ago the Journal presented an analysis reflecting our conclusions that a threat of an oil shortage was over, barring developments which do not appear probable. To our editors it was a shift that had been in the making for some time, as revealed in the Journal's weekly operating data, the charts, and the market reports.

When it was apparent that the changes represented definite trends supported by both domestic and world developments, we passed on to our readers the results of our studies as we have done many times in the past.

What we did not anticipate fully was the widespread public interest in our interpretations. Wire services quickly made available summaries of the conclusions throughout this and adjoining countries. Indicative of the increasing public interest in oil, requests were received for complete reports. Thousands of reprints were made. Inevitably outside the industry some applications were made not justified by the facts presented.

Official Washington received the news with varying reactions. One of the several oil-investigating committees had just passed on new warnings predicting fuel shortages for the coming winter. The trouble with Government in oil is that the industry moves faster than legislative committees, and their ponderous findings in analyzing current conditions after a prolonged investigation have historical value, but that is about all.

Some concern has been expressed within the oil industry that the end of the threatened shortages in oil would be interpreted as the go-sign for the unrestricted use of oil as fuel. We see no reason why last year's campaign calling for the economical use of oil as fuel, one of the outstanding accomplishments of those responsible for the oil industry's public-relation program, should not be continued.

Utilization of a product without waste is always a sound merchandising policy. This is particularly true of petroleum as a fuel because, with the return to normal conditions, this use will be subject to the competition of other fuels and in refinery operations will be secondary to the refining of gasoline and other essential products.

The job ahead is to appraise the long-range significance of several developments of the past few years—the gain of more than 100 per cent in Venezuelan production and the tripling of Middle East output, improvements in all phases of processing, the expansion in transportation, and other major operating changes. Large permanent gains in consumption are assured, but there is need to determine what demands reflect the temporary buying power of a boom period and what will be accounted for by this country's aid to other nations and for what period.

New yardsticks must now be used in analyzing petroleum's position in the future domestic and international economy.

New Company Asks Permit for 1,184-Mile Gulf-Chicago Gas Line

GULFCOAST NORTHERN GAS CO., a new corporation, has filed application with the Federal Power Commission for authority to construct a 1,184-mile, 26-in. natural-gas pipe line from the Gulf Coast to the Chicago area. Cost of the project is estimated at $119,000,000.

It was the second announcement within a week of a major pipe-line construction project. Earlier the FPC revealed that Piedmont Natural Gas Corp. had filed application for authority to build a 990-mile, 20-in. line from the Upper Gulf Coast area to Danville, Va. Cost was estimated at $75,444,000. *(For details of this line, see page 95.)*

F. E. STANLEY

According to the Gulfcoast Northern application, the proposed line would originate in the vicinity of La Gloria and Seeligson fields, near Corpus Christi. It also would draw on gas reserves in Desoto, Lincoln, Webster, Bossier, and Claiborne parishes in northwest Louisiana. The line would terminate at or near Station 10 of Natural Gas Pipeline Co. of America in Henry County, Illinois. It would cross the Mississippi River near Cape Girardeau, Mo.

The company said the line would have an initial capacity of 245,000,000 cu. ft. per day, increasing to an ultimate capacity of 350,000,000 cu. ft. per day.

12 Stations Planned

Twelve compressor stations with an aggregate of 115,200 hp. are to be installed, and 83 miles of laterals laid. The latter would include 57 miles of 18-in. pipe to Feazel gas field and 26 miles of 10¾-in. pipe to Logansport gas field.

Allocation of the necessary steel has been assured "if certificate authority . . . is granted within a reasonable time," the application said.

The company said it plans to begin preliminary work as soon as a certificate is issued, and probably would be in a position to begin actual construction work within 180 days.

The company, which is incorporated in Delaware, will have its main offices in Tulsa. F. E. Stanley, president of Midwestern Constructors, Inc., and Midwestern Contractors, Inc., Tulsa, is president of the new company. Stanley has had long experience in pipe-line construction. After attending Oklahoma A. & M. College he was connected with the Cities Service Gas Co. and subsidiaries for 4 years starting in 1925 doing inspection work and supervising construction. Later he was connected with Texas-Empire Pipe Line Co., and from 1933 to 1937 he was employed by Natural Gas Pipeline Co. of America, serving part of the time as superintendent of the pipe-line and compressor station department. He was connected with the Sheehan Pipeline Construction Co. in 1938 previous to joining the Midwestern interests. He is also president of the Associated Natural Gas Co., Sikeston, Mo.

Lynch Is Vice President

John F. Lynch of the La Gloria Corp., Corpus Christi, Tex., who has been prominently connected with natural-gas and natural-gasoline operations in Texas, is vice president of the new company. Theodore Rinehart of the law firm of Doerner, Rinehart, and Stuart, Tulsa, is secretary and treasurer.

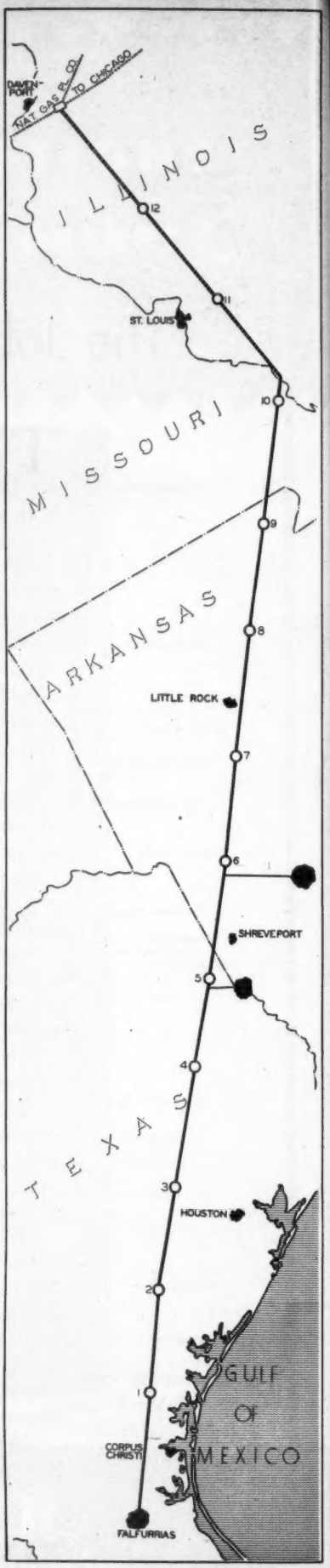
In addition to the above officers the following will serve as directors: Clyde Alexander, president, Creslenn Oil Co., Dallas; N. V. Kinsey, independent operator, Carthage, Tex.; W. G. Skelly, president, Skelly Oil Co., Tulsa; Ray C. Fish, Fish Engineering, Houston, Tex.; and W. F. Matheny of the Sid Richardson interests, Fort Worth. Several oil and gas operators are interested in the company ownership and in the sale of gas which will supply the new system.

Gulfcoast Northern would deliver its gas to Natural Gas Pipeline Co. of America, which supplies gas to Chicago District Pipe Line Co., Peoples Gas Light & Coke Co., Public Service Co. of Northern Illinois, Western United Gas & Electric Co., and Public Service Co. of Northern Indiana.

These companies serving the Chicago area, the application said, "now need in excess of 245,000,000 cu. ft. of natural gas per day to supplement their present supply of gas, and within approximately 1 year after the new line . . . is constructed, will need in excess of 350,000,000 cu. ft. of additional gas per day.

More Capacity Needed

The great shortage of natural gas in the Chicago and nearby areas is



due to a lack of pipe-line capacity, the petition said, adding that the fields from which the supply of gas is now being obtained are declining.

"The Gulf Coast area from which the applicant will supply gas is the only producing area containing sufficient undedicated reserves to properly support the construction of the required new line," it said.

Regarding the availability of gas, the company said that the "owners of reserves in these fields totaling between 5 and 6 trillion cubic feet of natural gas are willing to dedicate such reserves to the pipe line" for at least 20 years. The company would, it declared, make every effort to use the maximum quantity possible of gas which now is being flared.

The company's estimate of the total of cost of building the line was broken down as follows: main pipe line and accessories, $54,767,885; compressor stations, $23,040,000; lateral lines, $3,000,000; river crossings (installation), $4,525,325; provision for contingencies, working capital, supervision and other items, $16,833,395.

The company proposes to finance the project by the issuance of $89,250,000 in 3½ per cent, 20-year bonds; $17,850,000 in 5 per cent preferred stock; and $11,900,000 in common stock.

No Products Shortage Seen if Winter Is Normal, Economists Tell Compact

NEW YORK.—Stocks of petroleum products have been rebuilt to adequate working levels and are increasing so that adequate inventories can be maintained throughout the winter and there should be no serious distribution difficulties provided there is normal weather during the coming winter, the Interstate Oil Compact Commission was told by its economics advisory committee August 31.

The achievements of the industry in increasing the supply of petroleum and its products have made it possible to meet fully the record consumer demands this summer for gasoline and at the same time to accumulate inventories of other products at a satisfactory rate for this season, the committee reported.

It said that continued domestic crude-oil production at the rate of 5,600,000 bbl. daily and a supply of 415,000 bbl. daily of natural-gas liquids will be required for the 6 months starting October 1 to meet current estimates of demand, assuming a net excess of imports over exports of almost 200,000 bbl. daily.

Demands for the coming winter are estimated by the committee to show an increase over the preceding winter of 450,000 bbl. daily, or 7 per cent. This estimate was revised upward by 50,000 bbl. daily, or less than 1 per cent, over the committee's estimate of last May to reflect some additional military requirements and slightly larger gasoline consumption, and the committee stated that further revisions may be necessary in military requirements.

In its forecasts the committee stressed that it assumes normal weather this winter, whereas last winter was unusually cold. Forecasts of demand for kerosine and distillate fuels, it said, also assume that installation of equipment for new users will not materially exceed the current rate. It also pointed out that petroleum demand is now so large that a small percentage change means a quantity substantial enough to affect materially the industry's problems. Since a variation of 1 per cent represents about 65,000 bbl. per day.

For the period October 1, 1948, to March 31, 1949, the committee made the following estimates of demand, in thousands of barrels daily: gasoline, 2,412, up 8 per cent over last winter; kerosine, 443, up 10 per cent; distillate fuel oils, 1,350, up 13 per cent; residual fuel oils, 1,583, up 1 per cent; other products, 955, up 6 per cent; total, 6,743, up 7 per cent.

Total domestic demand for the 6 winter months was forecast at 6,390,000 bbl. daily, an increase of 455,000 bbl. daily or 8 per cent, over last winter. Export demand during the same period was forecast at 343,000 bbl. daily, a decrease of 6,000 bbl. daily, or 2 per cent.

In discussing the stock position, the committee declared: "It now appears that additions to petroleum inventories in the United States will be about 310,000 bbl. daily during the second and third quarters of this year, thereby rebuilding stocks to adequate working levels. It is estimated that withdrawals from stocks of about 180,000 bbl. daily can be made next winter while maintaining inventories that should be sufficient for normal operations.

"In the year ending March 31, 1949, the committee estimates that stocks of all oils will have increased by 25,000,000 bbl., or about 5 per cent. If these inventory levels are realized, no serious distribution difficulties in the first quarter of 1949 are anticipated."

Noting that crude-oil inventories are at very low levels, the committee's estimates for crude-oil requirements included an addition to stocks of 10,000,000 bbl. during the winter.

During the next 7 months, the report said, crude production must average 5,600,000 bbl. daily and runs to stills 5,700,000 bbl. daily, explaining that these figures are only slightly above recent operations and seem quite reasonable of attainment.

The committee's forecast anticipates an increase in imports from 485,000 bbl. daily this summer to 550,000 bbl. daily next winter. Exports are assumed to average 350,000 bbl. daily, or about the same as last winter, based on continuance of present export controls.

Refineries were urged to make an early upward adjustment in the yields of kerosine and distillate fuel oil, as the committee said this will be equally as difficult as last winter.

Regulation Opposed

Confidence that the oil industry can fill all demands of the public for petroleum products under the guidance and direction of the state governments without any federal control was the theme of the 3-day meeting.

Politics were kept in the background, and Gov. Thomas E. Dewey of the host state kept himself off the program to separate the Compact's activities from his presidential campaign. But the doctrine of states' rights pervaded discussion of the tidelands question and many other aspects of government and industry relations.

The most bitter denunciation of federal regulation was the address by Sen. George W. Malone of Nevada who opened up with the statement: "The kindergarten method of measuring the projected estimated consumption of oil against the known reserves to determine whether we are running out of oil, utilized currently by high government officials, is dangerous to the peace and safety of the United States."

The answer to the question of whether we are running out of oil lies in whether we guarantee our system of freedom of opportunity so that if oil is, in fact, in the ground, we assure its discovery, Malone declared.

He attacked what he said was the short-sighted view of federal officials for the past 15 years of predicting that we are running out of oil, saying this philosophy is being reflected in our tariff and other national policies, aimed at encouraging imports of oil in the name of conservation of domestic resources. Lack of a definite and long-range foreign policy, Malone said, is largely responsible for the present shortage of steel for the domestic oil industry, and he called for a positive program to make it possible for the industry to plan in advance without danger of being "shot from ambush" by an unexpected announcement from Washington.

Malone announced that the Senate

committee on natural resources, of which he is chairman, will publish a report on the fuels position of the United States following additional hearings early in October, which will show areas where additional oil reserves probably can be discovered and also an inventory of the possibilities of producing liquid fuels from other sources by synthetic processes.

A recommendation that the oil industry furnish the Compact Commission data on new well production and on production losses through abandonments as the basis for a new series of statistics on this subject was made by the research and coordinating committee.

This committee announced that it is completing a preliminary report on its assignment to make an objective study of synthetic fuels and their relation to conservation of oil and gas. This will cover the status of the various government and private research projects on shale, coal, and natural gas.

Coal Is Question

Expressing doubt that coal reserves are adequate to last for 2,000 years, as some have estimated, the committee announced that it has undertaken a study of the economic availability of coal in each state, designed to show how much coal could be obtained at present prices and at various other price levels.

The regulatory practices committee submitted a series of reports digesting the administrative rules and regulations pertaining to oil and gas operations of each state belonging to Compact and will ask for similar data from nonmember states having oil production. The committee urged publication of these reports, saying that the industry and the general public are not sufficiently aware of the extent and efficiency of state regulation.

Speakers Wednesday included Col. Ernest O. Thompson, chairman of the Texas Railroad Commission; William J. Murray, Jr., member of the commission; and William S. Livengood, secretary of the Pennsylvania Department of Internal Affairs. The speech prepared by Gov. Frank Carlson, Kansas, was read by Jeff A. Robertson, chairman of the Kansas Corporation Commission in Carlson's absence.

Thompson praised the compact's waste-prevention efforts, and told the delegates that the body had performed its work so well that "the threat of federal control is now breathing its last dying gasp." "Only the bureaucrats now want it," Thompson asserted, "—and they want it only for the centralization of power in their hands."

Storage Increase Needed

Murray told his audience that butane storage must be increased if winter shortages are to be avoided. Two main obstacles to this solution to the problem, he said, lie in the high cost of construction of these facilities and the fact that sufficient steel supplies are not available.

"It therefore remains for us to do the best job we can with what we have; to enter cold weather with every available barrel of storage filled, and to reduce consumption as much as possible," Murray declared.

Livengood told the compact members that the future of oil production lies in the improvement of production methods and the discovery of new fields. The industry must, he asserted, look for new oil supplies "where we have heretofore not believed them to be."

He urged closer cooperation between the states and the industry and between "sister" states in the compact in order to promote a more intense program of exploration and to avoid the evils of federal regulation.

In an address Tuesday, Gov. Beauford Jester of Texas scored attempts by federal officials aimed at control over the oil industry and said a program of cooperation would do more "to assure the greatest supply of oil for our future."

He outlined a nine-point plan and suggested that the Government adopt it.

Brown Assails Talk of "Fading" Oil Industry

WASHINGTON.—Contradictory statements of industry spokesmen regarding the oil situation and outlook were attacked last week by Russell B. Brown, general counsel of the Independent Petroleum Association of America, as an impediment to the development by Congress of a proper approach to the petroleum problem.

In a report to the I.P.A.A. President Merle Becker, Brown criticized particularly statements by officers of companies interested in foreign production to the effect that gasoline rationing will be inevitable if Middle East problems are not solved, or Venezuelan production is not encouraged, or if Mexican oil is not developed.

Other statements which Brown challenged were to the effect that domestic crude production has reached its peak and the United States will be increasingly dependent upon foreign oil. One major company's statistical department, he pointed out, developed figures last winter "suggesting" that the rate of crude production would not rise above the 1947 level.

The major objection to statements of this type, Brown said, is that they suggest the domestic oil industry is rapidly fading out of the picture and that "there is plenty of oil everywhere except in the United States."

So far, Brown commented, congressional committees have not adopted this viewpoint, which was strongly pressed last winter by Interior Secretary J. A. Krug and Defense Secretary James V. Forrestal to support their proposals for immediate development of a synthetic liquid-fuels industry.

OIT Tightens Export Regulations on Lubes

WASHINGTON.—The Office of International Trade has tightened up its regulations covering the filing of applications for permits to export lubricating oils and greases, as a result of an increase in the number of incomplete applications noted recently.

Effective immediately, applicants must give a complete description of the commodities listed on the application, including the Saybolt viscosity at 130° F. or 210° F., pour point and flash point and "any other information which will enable the Office of International Trade to make an exact identification of the commodity for which an export license is requested," and must state the quality (high, medium or low) of the lubricating oil or grease.

The OIT reminded exporters that the stated end use is an important consideration in the licensing of these commodities for export, and for this reason, all applications must contain detailed information regarding the proposed end use, identifying the particular industry or government activity (railroads, public utility, mining, for example) and, where possible, the specific functions (aviation motors, trucks and tractors, open bearings, etc.).

Applications for export licenses which do not contain sufficient detailed information for an exact description of the commodities involved and complete information regarding the end use will not be considered, but will be returned to the applicant without action, it was stated.

N.I.C.B. to Make Study Of Petroleum Situation

WASHINGTON.—The National Industrial Conference Board is preparing to make a complete study and evaluation of the petroleum situation.

The board will undertake the project with the cooperation of the American Petroleum Institute, and a committee of economists and statisticians is being set up under the chairmanship of Sidney Swensrud to cooperate in selecting a panel to make the study.

this week

PIPE LINES—Gulfcoast Northern Gas Co. files application for authority to build 1,184-mile, 26-in. gas line from fields near Corpus Christi to Chicago area. . . . Project cost estimated at $119,000,000. . . . Line would have ultimate capacity of 350,000,000 cu. ft. daily. . . . ¶Piedmont Natural Gas Corp. files application to build 990-mile, 20-in. gas line from Upper Gulf Coast area to Danville, Va. . . . Line would cost $75,444,000. . . . ¶Movement of crude oil through new Jal, N. M.-Wichita Falls, Tex., line reaches 92,000 bbl. daily. . . . ¶Trans-Continental Pipe Line Co. to begin laying pipe for its 1,800-mile, 26-in. gas line in May 1949. . . .

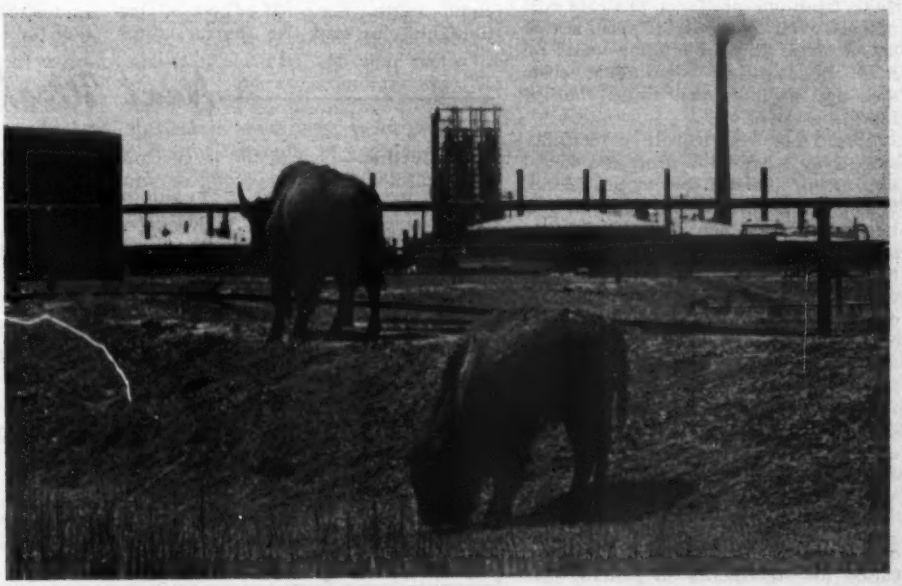
INTERNATIONAL—Present rate of building and reconditioning in Italian refining industry indicates processing rate of 61,000 bbl. daily by the end of 1948. . . . Production rate now in Middle East and upward trend in output suggests area may exceed Venezuela in production later this year. . . . Venezuela asks for bids on 115,000 bbl. of 18°-gravity crude oil. . . . Sets minimum price of $2.70 per barrel. . . . Work order issued for new refinery at Tynemouth, England. . . . Completion expected in 2 years. . . . Colombian Government announces plans to extend Tropical Oil Co.'s products line 92 miles. . . .

INDUSTRY—Nonprofit research organization, financed by cooperating oil companies, to make 3-year study of drilling techniques and equipment. . . . Thirty-four companies now members of group. . . . ¶Ten companies join in cooperative arrangement with Bureau of Mines to experiment on oil shale and shale oil. . . . ¶Sun Oil Co. President Robert G. Dunlop declares current level of profits essential to enable industry to meet demands for products. . . . ¶Russell B. Brown, I.P.A.A. general counsel, attacks statements belittling domestic industry. . . . ¶Oil industry representatives differ in views on allowables for offshore wells in Louisiana hearing. . . .

TRENDS—Production of crude oil again sets an all-time record with a daily average output of 5,521,380 bbl. during the week ended August 28. . . . New record is the eighteenth this year. . . . ¶Wildcat completions also set new record as 156, 11 more than the previous record, were reported completed during week ended August 28. . . . Total completions were 815, only 20 below all-time high of August 7. . . . ¶Runs to stills averaged 5,591,000 bbl. daily during week ended August 21,, not far below the all-time high set in July. . . . ¶Yields of distillates continued high, with an average of 18.2 per cent during the past 7 weeks, compared with 16.4 per cent during the same period a year ago. . . . Kerosine yield was down percentagewise, however, at 5.3 per cent compared with 5.6 a year ago. . . . ¶Stocks continued to gain, with the four major products increasing 2,238,000 bbl. during the week. . . . Gasoline showed the only drop. . . .

GOVERNMENT—National Security Resources Board tells President Truman forceful action not needed now to get required amounts of oil and steel. . . . ¶Military oil demands, cut by 4,880,000 bbl., now nearly met completely. . . . ¶Munitions Board, pushing its program for stockpiling of critical materials, continues to ponder problems of storing adequate supplies of petroleum. . . .

NATURAL GAS—Decline in California's natural-gas production predicted by Roy M. Bauer, gas supply supervisor for Southern California Gas Co. and Southern Counties Gas Co. of California in hearing before FPC on applications of the two companies and El Paso Natural Gas Co. to increase capacity of the 1,200-mile Texas-California line by 180,000,000 cu. ft. daily. . . . New York State Natural Gas Corp. expansion program approved by FPC. . . .



Refinery lawnmowers are these two bison, now experimentally employed on the grounds of the Port Arthur refinery of Gulf Oil Corp. Together with 100 Brahma cattle, cows, and horses, the bison are being pastured for nearby ranchers on refinery grounds, where they save thousands of dollars annually in grass cutting costs

Industry Representatives Differ On Offshore "Bonus" Allowables

by Dahl M. Duff
District Editor, Houston

CONSIDERABLE divergence of opinion on the question of whether special "bonus" oil allowables should be granted Gulf of Mexico wells because of their high cost developed in testimony of company representatives August 24 in Baton Rouge at a hearing before S. L. Digby, Louisiana conservation commissioner.

After hearing the testimony, Digby deferred a decision on the several questions raised in the hearing. Among them were: whether the offshore wells should be given an immediate extra allowable subject to change on later performance data; whether a general formula should be fixed for offshore wells at this time; whether hearings should be held as each field and well is brought in to decide the allowable.

Higher Allowable Asked

Kerr-McGee Oil Industries, Inc., asked that its No. 2 offshore producer in Block 32, Terrebonne Parish, be given the same special allowable as the original discovery, 400 bbl. daily with a tolerance up to 600 bbl. daily in view of transportation difficulties. D. A. McGee, Kerr-McGee executive vice president, outlined some of the costs in offshore operations in support of the request.

Even with shallow wells from 1,500 to 2,900 ft. and as many as seven wells from one platform, pro rata cost of each well is about $150,000, six or seven times that of similar wells on land, he testified. Production costs also are six or seven times that of land operations.

"From our No. 1 well, principally since May 4, we have produced 45,000 bbl. of oil, and the cost of producing, transporting, and storing this oil has been 85 cents per barrel," McGee said. "With additional wells sufficient to bring the daily volume up to 3,500 to 4,000 bbl. per day, we estimate the cost may be reduced to 45 to 50 cents a barrel." These figures, however, he added, as based on operations in favorable weather in the Gulf, since the company's experience is not yet sufficient to determine what may be expected from storm hazard or damage.

Mottet Favors MER

Varied opinions were expressed by other company officials after Digby called for statements on general offshore allowable policy. D. A. Mottet, Humble Oil & Refining Co., in a written statement said Humble desires to operate offshore properties "so that a maximum ultimate yield of oil may be secured." He said Humble recognizes the cost element but does not feel any well, wherever located, should be produced at a rate that will reduce ultimate production. He said the company does not feel justified in producing its own offshore Grand Isle discovery greater than the present 188-bbl. allowable until reservoir behavior is better known.

William P. Hardeman, representing Stanolind Oil & Gas Co., said a general formula at this time would be premature. He added the company agreed with Kerr-McGee that the production rate should compensate for the high costs so long as reservoir efficiency is not impaired. E. P. Keeler, Magnolia Petroleum Co., recommended that no allowable formula be adopted since, he said, each reservoir will be found to have different problems.

A. B. Tanco, Atlantic Refining Co., said his company is considering Gulf of Mexico operations. He recommended some definite allowable be fixed for bringing in of a well and said it should be higher than for inshore wells. Harry Polk, The California Co., said his company agrees "in principle" with Kerr-McGee. "Our thought," he said, "is that a bonus of 150 bbl. added to the regular allowable based on the depth of a well will permit everybody to live until we find out where we are."

On the basis of Louisiana's depth scale, the Kerr-McGee No. 2 well would be entitled to an allowable of 76 bbl. daily. McGee said he had no objection to fields being considered separately but asked that allowables be set in advance of completion so that sanding-up difficulties such as were experienced in No. 2 can be avoided.

Steel Assured for Production Equipment

WASHINGTON.—The Department of Commerce this week made effective voluntary agreements under which the steel industry will allocate 16,530 tons of steel products monthly to manufacturers of tank and oil field production equipment and 20,000 tons monthly to builders of domestic barges and towing vessels.

The department also held a hearing August 31 on a proposal to channel 40,380 tons of steel monthly for the production of oil tankers, with representatives of the Maritime Commission, Navy, and Armed Services Petroleum Board strongly supporting the program.

The amount of steel which would be earmarked for tanker construction is roughly double the amount estimated by the National Petroleum Council committee on steel requirements last spring. That estimate covered only the construction of the equivalent of 38 T-2 tankers, but the number actually under construction or on order now has jumped to 63 and the Maritime Commission has bids out for the building of 20 others of 26,000 deadweight tons each. It is now figured that 81 tankers will be under construction during the first quarter of next year.

Next Week

Cycling.—One of the largest operations of this type in existence will be discussed. Gas cycling, of course, broadly is the producing of gas from an underground reservoir, processing through extraction plant for recovery of liquefied hydrocarbon fractions, and compression of the remaining residue gas back to reservoir pressure for delivery to the injection wells. The article describes the principal factors involved in the huge project.

Unisol process.—Refining engineers with Atlantic Refining Co. give development and operational data for their large unit at Atlantic's Philadelphia refinery.

Casing cementing and perforating practices.—An engineer prominently identified with latest developments and procedures in this work presents a review of factors and equipment.

Active fields.—A Journal-Guide presentation of Jameson field, Coke County, Texas, will appear, including ownership map up to date with all wells completed or drilling, and electric-log representative of the field.

Forceful Action to Get Oil, Steel Not Needed, NSRB Tells Truman

WASHINGTON.—The National Security Resources Board has informed President Truman that invocation of the mandatory-order powers granted in Section 18(a) of the new Selective Service Act is not necessary at this time, but reported that it will maintain a continuous survey over military procurement of oil and steel.

The board's findings were released by Truman from the presidential yacht Williamsburg while on his precampaign vacation cruise. He did not state formally that he would abide by the board's recommendations, but the fact that he made them public indicated they were acceptable to him.

Representatives of the Armed Services Petroleum Board threatened at the July meeting of the National Petroleum Council that if military oil requirements were not promptly met, invocation of the mandatory order powers would be recommended.

Under Section 18(a) of the Selective Service Act, if military requirements are not being met adequately the President is authorized to place orders with manufacturers or producers which must be filled ahead of all other orders, civilian or Government, with the question of price to be settled at the convenience of the Government. Willful failure to accept such orders and meet requirements as to time of delivery, quantity, or quality would be punishable by heavy fine or imprisonment and seizure of plants.

Study Results Announced

In view of the difficult situation in which the military found themselves in July, the NSRB made a study of military needs, particularly for oil and steel. The oil industry, however, reacted promptly and military requirements for the remainder of the year now are practically covered.

The findings of the board, as announced by the President, were as follows:

"1. The use of the authority contained in Section 18(a) of the Selective Service Act is unnecessary at this time. The existence of the authority appears thus far to be sufficient to safeguard the procurement requirements of the armed services and the Atomic Energy Commission by voluntary methods.

"2. The requirements and supply situation must be watched closely and continuously so that prompt steps may be taken upon any indication that voluntary methods 'formal and informal,' existing and pending, are not effective. The National Security Resources Board proposes to review the situation on a continuing basis.

"3. The two commodities requiring the closest scrutiny are petroleum and steel. Should existing and pending voluntary agreements involving these commodities prove ineffective, and if they cannot be made effective, the mandatory order authority should be promptly invoked."

Military Demands Cut, Bulk Needs Nearly Met

WASHINGTON. — Armed services petroleum demands on the domestic industry for the last half of 1948 have been reduced by 4,880,000 bbl. in the past month, it was reported last week by Howard W. Page, acting chairman of the National Petroleum Council's military and government requirements committee.

At the same time, Page announced that, with the possible exception of 345,000 bbl. of diesel oil to be procured on the West Coast later in the year, all bulk requirements of the military to the end of next December now are covered, although there are some deficiencies in regional requirements, largely in motor gasoline and heating oils.

The latest reestimation of military requirements for the last half of 1948 places the total at 60,005,000 bbl., a reduction of 1,067,000 bbl. from the previous estimate a month ago. The reduction was due mainly to a sharp cutback in requirements for distillates and smaller cuts in motor gasoline and kerosine which were only partially offset by increases in aviation and Navy special fuels.

By arranging to increase liftings from foreign supply points, however, the armed services have brought their estimates of supplies to be required from the domestic industry from 47,936,000 to 43,056,000 bbl., and a calculation by the NPC committee shows that present domestic requirements represent 10.18 per cent of crude runs on the West Coast, 0.81 per cent inland, and 4.1 per cent on the Gulf and East Coasts or, over-all, 4.12 per cent of national crude runs.

The most recent estimate places domestic requirements of aviation fuel, including 1,377,000 bbl. of jet fuel, at 14,680,000 bbl.; motor gasoline, 6,538,000; kerosine, 742,000; distillates 7,424,000; Navy special fuel, 7,809,000, and other residual, 5,863,000. These figures are based on the assumption that 1,535,000 bbl. of motor gasoline, 4,262,000 Navy diesel and 11,152,000 Navy special fuel oil will be supplied from the Caribbean and Persian Gulf.

Present Profit Level Is Vital, Dunlop Says

THE current level of profits of the oil industry is vitally necessary to enable it to meet the demands being made upon it and to assure the consuming public and the armed services adequate supplies of petroleum products at reasonable prices in the years ahead. This view is expressed by Robert G. Dunlop, president of Sun Oil Co., in the current issue of the company's magazine in an article—"Are Oil Profits Too High?"

He said that "America's record demand for petroleum products is being met because oil-industry dollar profits are sufficient to bear the burden of a needed $4,000,000,000 expansion program."

Although dollar earnings are the greatest in the history of the oil industry, it remains to be seen whether this is evidence of a healthy situation. Dunlop explained that "only one-third of the industry's profits last year was paid to stockholders, the remaining two-thirds being used for replacement and expansion of industry facilities."

Dunlop struck out at proposed government controls over profits and prices. Increased taxation of corporate profits would hobble the oil industry's efforts to meet public and armed services demand, he said, with a continued tight supply-demand situation as the result. Imposition of governmental price controls would most certainly limit or reduce the output of high cost or marginal producers, destroy incentives, and adversely affect all production, he added.

"An excess supply of money in proportion to production resulting from loose monetary policies, is responsible for spiraling demand, and this economic condition is the basic cause for an unprecedented post war demand for petroleum products, although increased population, desirability of products and price disparities also have been factors," he explained.

Through its utilization of profits "the oil industry can and is satisfying the desire of the American people for oil products and a better standard of living," Dunlop concluded.

International

WORLD-WIDE OIL DEVELOPMENTS

61,000 Bbl. Daily Is 1948 Target Of Italian Refining Industry

ITALY's oil-refining industry is expected to reach a processing rate of 61,000 bbl. daily before the end of this year, nearly double its 1947 capacity of 33,400 bbl. daily.

The huge increase indicates the progress made in reconditioning war-ravaged refineries, expanding existing plants, and in construction under way in anticipation of the movement into Europe of vast quantities of Middle East crude oil.

At the present time applications are pending before the Office of Liquid Fuel of the Italian Ministry of Industry and Commerce for authorization to build five more refineries with a combined capacity of 104,000 bbl. daily. In addition, plans of companies now operating in the country call for the addition of nearly 40,000 bbl. to the daily processing capacity of existing refineries.

Aquila Refinery Rebuilt

Completion of work on the Trieste refinery of Societa Tecnico Industriale Aquila this year has added substantially to the Italian industry's ability to process imported crude. The refinery is now operating at its prewar charging capacity of 10,000 bbl. daily, after having rebuilt its atmospheric distillation units and its units for chemical treatment of light products. Work at the refinery still is continuing.

In two refineries, major construction is now under way, and major expansion programs are planned for two more.

At Venice, Industria Raffinazione Olii Minerali (IROM), which took over the refinery of Azienda Generale Italiana Petroli (AGIP), has completed an additional catalytic cracking unit and now has under construction facilities for the production of high-grade lubricating oils. At La Spezia, the Royal Dutch Shell firm, "Nafta" Soc. Italiana del Petroleo ed Affini, now has a major expansion program under way.

The two refineries where major expansion is planned are the Bari and Leghorn refineries of Azienda Nazionale Idrogenazione Combustibili (ANIC), which has completed negotiations with Standard Oil Co. (N. J.) for increasing their present combined capacity of 9,500 bbl. daily to a combined capacity of 40,000 bbl. daily.

A modernization program currently is under way in the Naples refinery of Raffineria de Napoli, S.A.I. (Socony-Vacuum).

Applications Pending

Applications for new refineries now pending before the ministry of industry and commerce include:

Dr. Kind, former director of the Aquila refinery, for a 30,000-bbl. refinery in Milan.

Caltex/Fiat, 40,000-bbl. refinery in the Po Valley.

Apri/Edison Electric Co., 20,000-bbl. refinery in Genoa.

Royal Dutch Shell, 10,000-bbl. refinery in Massa Carrara.

Lombarda Raffinazione, S.A., 4,000-bbl. refinery at Montova on the Mioncio River.

Also pending before the ministry are applications of Raffineria de Napoli, S.A.I., to increase the capacity of its Naples refinery from 6,000 to 10,000 bbl. daily and Permolio S.A. of Milano, to increase the capacity of the Milan refinery from 3,000 to 4,000 bbl. daily.

According to the applications, the proposed construction programs would be carried out within the next 3 or 4 years.

The 61,000 bbl. daily rate expected to be reached by the industry this year is expected to include 8,600 bbl. daily of gasoline, 4,600 bbl. of kerosine, 9,800 bbl. of gas oil, and 38,000 bbl. of heavy fuels.

The rapid development of the Italian refining industry has created an acute shortage of storage facilities, currently estimated by the oil industry in a report to the Italian Government at nearly 2,000,000 bbl.

Permits now are being sought for the construction of additional storage capacity along the coasts. These new facilities would be located primarily on a basis of their accessibility to refineries. Until 1940 the location of storage facilities was determined primarily on a basis of their value in supplying the requirements of the Italian navy and air forces and their activity in the Mediterranean.

The new tankage will be built using the latest developments to assure low evaporation losses, and the Government is planning to send representatives to the United States before construction is begun to study new designs.

The current gains being made in increasing the output of the Italian refineries has had a marked effect on the use of methane gas as a substitute for gasoline in the operation of motor vehicles.

As a result, Idrocarburi Nazionali, S.A., has announced plans for the construction of a gas pipe line from Consandolo to Bologna to provide the methane for industrial use there. The line will be of 20-in. pipe and will have three compressor stations. Similar lines are to be built between Ferrara and Bologna and between Lodi and Dalmine, where the gas is to be used by the iron and steel industry using methods adopted in Germany during the war.

Colombian Oil Proposal Undergoes Further Study

The oil bill approved last year by Colombia's House oil committee calling for the organization of the Colombian Y.P.F. or "Empresa Nacional de Petroleos," has been referred by the Senate oil committee to Sen. E. del Valle, of Bolivar, who will render a report to the committee at an early date. The bill provides for an official oil enterprise to engage in all branches of the petroleum industry.

Another committee composed of six cabinet members who are meeting

with five members of the National Petroleum Council, three congressmen and three senators, will recommend to Congress a bill stating a definite policy on the future of the De Mares concession.

Further action on the bill calling for organization of the Colombia Y.P.F. was postponed upon approval of the motion by Sen. G. Salamanca, pending a report on the bill now being studied regarding the De Mares concession.

The Ministry of Petroleum recently employed geologists D. Donoghue of Fort Worth and Prof. George Fancher of University of Texas to report on reserves and ultimate production at De Mares, and W. L. Nelson, professor of refinery engineering at Tulsa University, to conduct an appraisal of the De Mares concession plants.

Venezuela Seeks Bids For Its Royalty Oil

The Venezuelan Ministry of Economic Development last week offered to sell 115,000 bbl. of 18°-gravity "Quiriquire type" crude oil for lifting within the first 15 days in September.

Bids, the announcement stated, must be over $2.70 per barrel f.o.b. Caripito, and must be within conditions set forth for the sale of royalty oil last year. Such conditions include among other things, that the oil be sold only to consumers or regular trade channels for their own use and that brokers are ineligible.

This is the first announcement by the Venezuelan Government of an offer of royalty oil on the open market since last summer.

Yugoslavia Purchases Anglo-Iranian Oil

Faced by unofficial oil sanctions imposed by Albania and Rumania, Yugoslavia has concluded a purchase of oil believed to total 10,000 tons (approximately 75,000 bbl.) from Anglo-Iranian Oil Co.

Because of the reported attempts of Yugoslavia to purchase oil through Trieste, diplomatic observers considered that the new move indicated the difficulties facing Yugoslavia as a result of the first moves of the Cominform countries of Eastern Europe to apply concealed sanctions.

It was believed that the British Government fully approved the Anglo-Iranian Co.'s decision to supply oil to Yugoslavia.

Creole Oil Production Continues High Level

Net oil production plus purchased royalty oil for the first 6 months of this year by Creole Petroleum Corp. totaled 114,673,375 bbl. or an average of 630,073 bbl. per day as compared to last year's average of 578,076 bbl. daily. Current production is 643,727 bbl. daily, it was announced by A. T. Proudfit, president of the Creole.

Earnings for the first half of this year amounted to $100,020,000, as compared to $62,006,401 for the same period of 1947.

Work on the Ule-Amuay pipe line is being speeded up and the first shipment of oil through the line is expected to be made by December 1, according to Proudfit.

Rumania Suspends Oil Shipments to Yugoslavia

"Temporary bottlenecks" is the reason given by the Russian-controlled Rumanian Government for halting oil shipments to Yugoslavia, but well-informed political sources state flatly that this is because of the independent stand recently taken by Yugoslavia's Marshall Tito.

Yugoslavia has been receiving considerable quantities of petroleum products from Rumania by boats which plied the Danube River.

Iran Will Appoint Advisory Oil Experts

The Iranian Government has approved a bill authorizing the appointment of three European oil experts to advise on Iranian oil rights concerning the British controlled Anglo-Iranian Oil Co. The experts, who may be French, Belgian, Dutch, Swiss, or Swedish, will advise on judicial, technical and economic problems.

The decision followed parliamentary debate recently on the Anglo-Iranian Oil Co. and the Bahrein Islands. Foreign Minister Nouri Es Fandiari said the Government considered null and void all pacts and understandings between two or more foreign powers concerning the islands or their oil.

Australia Prepares For Extensive Survey

A survey covering 10,000 sq. miles in the Roma district of Queensland, Australia, will begin as soon as the Royal Australian Air Force photographic survey unit completes its survey now being carried out in the Darwin area of Australia.

According to D. A. Pitman, consulting geologist to several oil companies in the Roma district, deep scout bores would likely be drilled after the geophysical survey now in progress is completed.

Rotary drilling to a depth of 6,000 ft. will be immediately available upon completion of the scout bores and surveys.

International

WORLD-WIDE OIL DEVELOPMENTS

Work Order Given on Tynemouth Refinery

Orders to proceed at once with the construction of a new refinery at Tynemouth, England, have been given by Trent Oil Products, Ltd.

C. Holdsworth, mayor of Halifax and company chairman, stated in London that this refinery is expected to be completed in about 2 years.

Mexican Gas Co. Plans 600-Mile Gas Line

A 600-mile natural-gas pipe line from Reynosa, Tamaulipas, gas and oil field to the industrial zone a few miles north of Mexico City is presently under consideration.

Negotiations are under way by Mexican Gas Co. and Industrial Gas Co. with Petroleos Mexicanos to purchase the supply of natural gas for the project.

The main pumping station would be installed at Monterrey with substations along the main line.

German Crude Imports Will Rise Next Year

Approximately 1,000,000 tons, about 40,000 bbl. daily, of crude oil will be imported into the American and British zones of Germany during the first 6 months of 1949, according to a report from Frankfurt.

This will compare with total crude-oil imports of 220,000 tons, about 8,800 bbl. daily, which is planned for the remainder of 1948. During the first 6 months of this year, only 90,000 tons, or about 3,600 bbl. daily, of crude oil were imported into Germany's Bizonal area.

Colombia Will Extend Tropical Products Line

The Colombian Government has contracted Acosta & Madero Paris, Ltd., consulting engineering and construction firm, to prepare complete engineering plans and estimates for a 92-mile products pipe line to be built as a continuation of the Tropical Oil Co. 60-mile products pipe line now operating between Barranca and Port Berrio.

Dr. Madero was formerly of the ministry staff and was government supervisor in the construction of the Tropical products pipe line. Dr. Acosta is a graduate of Texas University and formerly of the ministry staff, and is also author of various technical and economic articles.

Middle East Production Expected to Exceed That of Venezuela in 1948

INDICATIVE of the steady climb of crude-oil production in the Middle East is the fact that current daily output is now approximately 1,119,000 bbl. (exclusive of Egypt) compared with The Oil and Gas Journal's mid-year survey which showed the daily output as 994,000 bbl., or an increase of 125,000 bbl. daily. In the accompanying table, Egypt is included and thus the total daily output is shown as 1,155,000 bbl.

The table illustrates the tremendous growth of production during the past 10 years. Saudi Arabian production has multiplied more than 300 times during the period, and Kuwait has jumped from nothing to a present output of 145,000 bbl. daily. Total Middle East production has more than trebled during the period.

Current production in the Middle East is only slightly below that of Venezuela, and it is considered probable that it will exceed that of Venezuela before the end of 1948. That the over-all total output in the Middle East will be increased still further this year is a foregone conclusion. Venezuela in June had a daily average production of 1,338,000 bbl.

The oil resources of the Middle East are tremendous. Although still in an early stage of development, the recoverable oil reserves already proved are larger than the proved reserves of the entire Western Hemisphere.

International
WORLD-WIDE OIL DEVELOPMENTS

MIDDLE EAST PRODUCTION

Country—	1948	1945	1938
Iran	480,000	354,660	211,590
Saudi Arabia	419,000	58,390	1,360
Kuwait	145,000	.....	.....
Iraq	*45,000	90,000	89,000
Egypt	36,000	25,770	4,280
Bahrein	30,000	20,025	22,730
Total	1,155,000	548,845	328,960

*Normally about 90,000 bbl. daily, but with Haifa refinery in a temporary shutdown period only 45,000 bbl. daily is moving from Kirkuk to Tripoli.

But the gap between crude oil in the ground and increased oil products in the hands of users, remains to be filled by new oil wells, tanks, pipe lines, refineries, and tankers. Prospective projects of the oil companies in the Middle East for substantial increases in oil production from their concessions cannot all be completed by 1951. The rate at which they can be completed depends upon the availability of steel products and other critical materials to carry on expansion. Construction of the trans-Arabian pipe line to the Mediterranean is actually in progress, as compared with most other Middle East pipe-line projects still in the blueprint stage. Thus, a substantial part of the increased production needed by 1951 will be provided by this line, which is scheduled to deliver from 300,000 to 400,000 bbl. daily to Sidon, Lebanon, or possibly some other port on the eastern Mediterranean.

It is generally agreed that the interests of future world peace and security demand the restoration and improvement of the productivity of the war-torn economy of Western Europe. The European Recovery Program (Marshall Plan), the burden of which is falling upon the United States, is designed for that purpose. An essential element in this program will be a sufficient supply of oil products to support the planned increases in industrial efficiency and production. And here is where Middle East oil can and will play a dominant role.

The increased oil production necessary for European and other Eastern Hemisphere requirements must come largely from the Middle East, which is expected to supply 1,620,000 bbl. of oil daily in 1951, or about 800,000 bbl. more than Middle East daily production in 1947.

Right now it's a tossup as to whether Saudi Arabia or Kuwait will show the greatest crude-oil production increase, percentage wise, by the end of this year. From a daily average output of 44,000 bbl. in 1947, Kuwait production has risen to a current production of 145,000 bbl. daily, and is still rising. Saudi Arabia's average 1947 daily production was 246,000 bbl. and this has risen to around 419,000 bbl. daily, and it, too, is on the increase.

In Kuwait the production comes from 25 wells, not all of which are producing. Currently there are seven rigs operating and two more were being rigged up late in August. An additional three will be rigged up as soon as the necessary personnel is available.

A topping plant, with an initial daily capacity of around 20,000 bbl., has been planned for Kuwait, and it will be erected as soon as the necessary equipment—which prob-

A big item in Middle East operations is the housing problem. Here is the North Bawarda housing area at Abadan as seen from the air

ably will come from the United States—is available. Meanwhile, the Kuwait Oil Co., Ltd., is assembling whatever equipment is available.

In Saudi Arabia the recently discovery of the Ain Dar field has highlighted production activity there. And while a representative test has yet to be made, Arabian American Oil Co. personnel are so certain that the well has commercial possibilities that another well is currently being drilled in the same area. Discovery of oil at Ain Dar had led Aramco executives to speculate upon the probability that Saudi Arabia now has upwards of 10,000,000,000 bbl. in crude-oil reserves.

In March of this year, Aramco's 300,000-bbl. daily production was divided as follows: Abqaiq, 193,000 bbl.; Dammam, 96,000 bbl.; and Qatif, 11,000 bbl. The Abu Hadriya field is shut in, due to lack of transportation facilities.

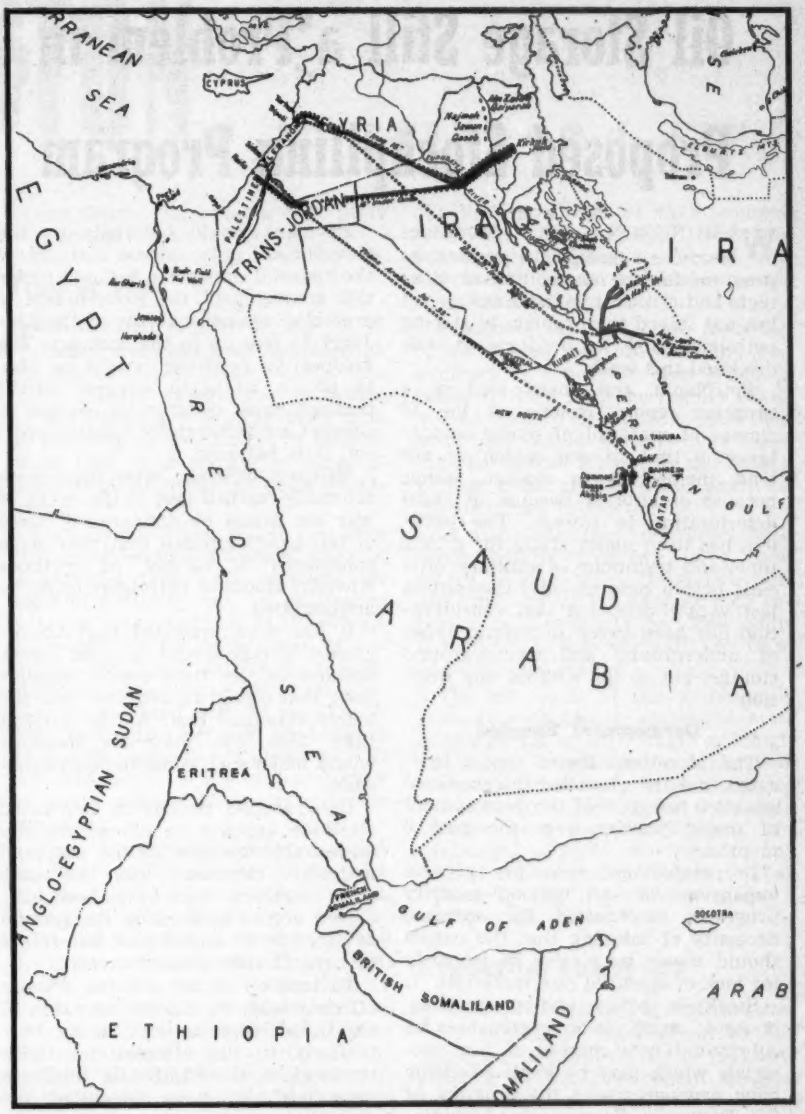
In Iran, where an all-time high of 539,000 bbl. daily was reached in May, the percentage output of the country's six producing fields is essentially the same as last year. The 1947 percentages were: Haft Kel, 44.5 per cent; Agha Jari, 29.5 per cent; Masjid-i-Sulaiman, 13.8 per cent; Gach Saran, 8.5 per cent; Naft Safid, 3 per cent; and Naft-i-Shah, 0.7 per cent. Production from the relatively recently discovered Lali field probably will reach commercial markets in the near future.

Sudr to Gain

In Egypt, where current daily production is approximately 35,700 bbl., that country's newest oil field, Sudr on the Sinai Peninsula, is now averaging 7,400 bbl. daily, and by the end of this year it is expected that this field alone will reflect a daily output of 40,000 bbl.—or more than the present combined output of Egypt. No commercial production has as yet been drawn from the most recently discovered Egyptian oil field, Asl, also on the Sinai Peninsula, which has a daily potential of 3,000 bbl. This potential is based on the discovery of a single well. Currently another well is being drilled at Asl.

Whether oil production from Qatar, another independent sheikdom in the Persian Gulf, reaches commercial markets within the next 2 years appears to depend largely on the availability of steel for a pipe line across the Qatar Peninsula from Dukhan field to Jebel Waqrah in the Persian Gulf. An initial production of from 20,000 to 25,000 bbl. daily is expected from Qatar sometime in 1950.

Sources close to the American Independent Oil Co., which recently acquired the undivided rights to 50 per cent of the Kuwait Neutral Zone, state that a geophysical party will start operations early this fall and that the first wildcat is expected to be completed by early next summer.



Map showing the location of oil fields and pipe lines, under construction and proposed, in the Middle East

While it has not yet been announced whether A.I.O.C. will carry on actual operations in the Kuwait Neutral Zone, or Aramco, which is a 50 per cent partner, indications are that A.I.O.C. would prefer to do the exploratory and development work. The latest information indicates that the Sheikh of Kuwait will get approximately 35 cents per barrel for any oil produced on a commercial scale and that Saudi Arabia's King Ibn Saud will receive the same royalty from Aramco as he gets in Saudi Arabia, which is around 23 cents per barrel. However, the royalty rates appear to even themselves out as the Sheikh of Kuwait gets only around 14 cents per barrel on current production in Kuwait proper.

By the end of this year it appears likely that Standard Oil Co. (N.J.) and Socony-Vacuum Oil Co., Inc., will have a much better idea as to the legal status of their partnership in Arabian American Oil Co. To date actual consummation has not been possible because of the disputed status of the legendary "Red Line Agreement." Sources close to these companies last week stated that if some amicable settlement is not reached with the 5 per cent partner in Iraq Petroleum Co., Ltd., (which is to say, with C. S. Gulbenkian), that the case will be brought to court in London this fall. Assuming that this case is permitted to run its legal course, it is possible that no legal settlement would be reached for at least 2 years. Meanwhile, there is no indication from any quarter that this will retard the full development of Middle East operations of Aramco and the Trans-Arabian Pipe Line Co.

Oil Storage Still a Problem in Proposed Stockpiling Program

WASHINGTON. — The Munitions Board is aggressively pushing its program for the stockpiling of strategic and critical materials but as yet has not solved the problem of storing petroleum and its products, it was disclosed this week.

Petroleum, the board said in a progress report, is one of the 19 classes of material of major importance in time of war which do not lend themselves to storage, either because of bulk or because of rapid deterioration in storage. The problem has been under study for a long time, and testimony of military officials before congressional committees last winter disclosed that consideration has been given to several types of underground and above-ground storage, but so far without any decision.

Development Speeded

The Munitions Board report indicated that the unsettled international situation has spurred the development of major policies over the past 6 months.

It pointed out that the general expansion of all national-security programs emphasized the extreme necessity of insuring that the nation should never be placed in jeopardy for lack of essential raw materials.

Stockpile policy and programing, it said, must take cognizance of substantial new sources of raw materials which may be made available from overseas under the program of the Economic Cooperation Administration.

In view of the continued short supply of many strategic and critical materials, it revealed, a number of steps are being taken, including the use of long-range contracts, in order to stimulate the production of such materials.

While the board did not specifically discuss petroleum, since it cannot now be stockpiled, the report did give a suggestion as to how oil procurement might be handled in the event the storage problem can be licked.

Because of the fact that current production of many strategic and critical materials moves promptly into the channels of trade under contractual arrangements, the board believes the long-term contract will be useful in bringing new sources of production into being.

It will do this, it was explained, by providing a guaranteed market to a new producer for a long enough period to enable him to amortize all or most development costs.

Payment would be made by the Government only against delivery of the material contracted for, and under this arrangement the Government is protected against inability of the producer to live up to the contract. The prospective producer would be able to obtain adequate advance credit through usual commercial sources to support a commercially feasible project, it is believed.

Military officials, who have continuously warned that in the event of war we would be dangerously short of oil, have disclosed that they have considered a variety of methods whereby stocks of petroleum could be accumulated.

It has been indicated that above-ground storage would be a last resort, because of the tremendous installations that would be required and the heavy financial cost. At the present time, also, the materials shortage would make such construction impossible.

Underground storage in fabricated facilities appears as almost equally undesirable because of the cost and materials situation, and the only other methods that have been discussed are to lock oil in the ground or store it in abandoned salt mines or natural underground caverns.

To lock oil in the ground, defense officials lean to the setting aside of additional reserves, with an eye particularly to the offshore oil fields involved in the California tidelands case, but also have suggested the possibility of procuring oil from the Middle East and trading it to some producer in return for oil in the ground.

Corrosion Engineers To Hear 13 Papers

Thirteen technical papers, all dealing with the problem of corrosion, will be presented in a 2-day meeting of the South Central Region of the National Association of Corrosion Engineers, September 20-21. The meeting will be held in the Hotel Tulsa, Tulsa.

The South Central Region is composed of local sections of the N.A.C.E. in the Tulsa, Houston, Shreveport, Corpus Christi, and North Texas areas. Program of the meeting follows:

Monday, September 20

10 a.m.—Opening addresses, Don Good, Texas Pipe Line Co., and Derk Holsteyn, Shell Oil Co., Inc.; "Galvanic Corrosion as Related to Oil and Gas Well Fluids," F. L. La Que, president N.A.C.E., International Nickel Co., Inc.; "Control of Corrosion in Condensate Wells," D. T. MacRoberts, United Gas Pipe Line Co.

1:30 p.m.—"Crude Still Overhead System Corrosion," A. F. Blumer, Esso Standard Oil Co.; "Steam Reboiler Corrosion," W. S. Janssen, Pan American Refining Corp.; "Corrosion Problems in the Manufacture of Sulfuric Acid," T. L. Hart, National Zinc Co.; "The Microscope as an Aid in Solving Corrosion Problems," H. M. Wilton, The Texas Co.; "Melting and Refining of Modern Steels," a movie presented by Allegheny Ludlum Steel Corp.

Tuesday, September 21

9 a.m.—Symposium on internal protection of sour-crude storage tanks, R. L. Bullock, Interstate Oil Pipe Line Co., leader; "Preliminary Evaluation of Resinous Coatings," W. R. Smith, Nukem Products Corp.; "Technical Factors in Testing Pipe Line Coatings," M. W. Belson, D. E. Stearns Co.; "Installation and Performance of Magnesium Ribbon Anodes," H. A. Robinson, Jr., Dow Chemical Co.; "Engineering Aspects of Cathodic Protection," E. P. Doremus, Cathodic Protection Service.

1:30 p.m.—"Electrolysis and Corrosion Experiences on 110 K.V. Underground Transmission Lines," S. E. Trouard, New Orleans Public Service Co., Inc.; "Mitigation of Corrosion on a City Gas Distribution System," A. D. Simpson, Jr., United Gas Corp.; "The Value of Backfill With Carbon and Graphite Anodes," J. P. Oliver, National Carbon Co., Inc.

Planning events for the Tulsa N.A.C.E. meeting are eight members of the local arrangements committee. Front row, left to right, are Armon H. Bost, Midwestern Engine & Equipment Co.; J. C. Stirling, Stanolind Pipe Line Co., general chairman; F. E. McNulty, Koppers Co.; and Irene Gadelman, Stanolind Pipe Line Co. Standing are D. B. Good, Texas Pipe Line Co., regional chairman and exofficio committee member; T. D. Williamson, Jr., T. D. Williamson, Inc.; H. M. Cooley, Bethlehem Steel Co.; and Ken H. Miller, Stanolind Pipe Line Co. R. L. Bullock, Interstate Oil Pipe Line Co., local chairman of the N.A.C.E., is an exofficio member of the committee but is not in the picture

WASHINGTON WATCHING

BY BERTRAM F. LINZ

Say No More!

WASHINGTON.—A seemingly thoroughly organized foreign effort to secure information regarding industrial installations, roads, transportation and communications facilities and other factors which would be of military value to an enemy in the event of war has been uncovered by Army Intelligence.

In a warning to business men, chambers of commerce, and trade associations to guard against furnishing information which might have military value to foreign interests, the Army called for special care on the part of companies and organizations in the petroleum industry.

So far, it has been learned, information of this nature has been sought in requests received by more than 80 chambers of commerce and scores of plant managers and others. The bulk of the inquiries come from the Soviet zone of Germany, but others have been received from Romania, France, Austria, Italy and Switzerland. The inquiries, generally, appear to be innocuous, but when considered as a whole the implications are plain.

Three Centers Named

Three principal centers of attention appear to be Wichita, Kans.; San Antonio, Tex., and Rockford, Ill. Wichita is the center of an oil and natural gas field, and all three cities are surrounded by military and munitions sites.

Military Intelligence authorities showed the pattern of this long-distance espionage effort. An inquiry from Soviet-occupied Germany sought information on Wichita's altitude, geographical location and climate; an "Austro-American Society" in Vienna asked San Antonio for a directory of business concerns in that area and a "Swiss journalist" sought photographs of "interesting scenes" of the city and surrounding area; the Leipzig Museum asked for telephone directories of several southwestern cities for the years 1920, 1930, 1940, and 1947, and a Leipzig manufacturer asked the Rockford Chamber of Commerce for a map showing the highways and railway lines of the state.

Such bits and pieces of information can be put together by trained analysts to form a strategic guide for bombing attacks and sabotage, the Army said, urging that anyone receiving suspicious requests from abroad communicate immediately with the nearest office of the Army, Navy, Air Force, Federal Bureau of Investigation, Department of State or National Munitions Board.

Tanker Tips

TRANSPORT ability of the U. S. tanker fleet has been increased by the use of larger, faster vessels to a much greater extent than indicated by the increase of slightly more than 25 per cent in the number of tankers since 1939, it is shown by a recent analysis of the world oil-transport situation.

Our tanker fleet, which in June 1939 consisted of 384 units of 4,300,000 deadweight tons, now numbers 493 units of 6,900,000 tons, an increase in average size from 11,100 to 15,100 tons. As a result of the replacement of war losses, only 9 per cent of the present fleet consists of vessels over 20 years old, as compared with 33 per cent in 1939, and only 3 per cent are between 15 and 20 years, as compared with 42 per cent, while 88 per cent are under 15 years, against 25 per cent before the war.

More significant, however, is the fact that only 19 per cent of the present fleet is of less than 12-knot speed, compared with 83 per cent in 1939, while 72 per cent is between 12 and 15 knots compared with 15 per cent, and 9 per cent can do better than 15 knots, compared with 2 per cent.

In addition to our own fleet, United States interests own or control 131 tankers of 1,800,000 deadweight tons out of the 168 vessels of 2,200,000 tons in the Panama tanker fleet, giving American interests a good third of the 23,700,000 ton world tanker fleet.

A still greater expansion is planned for the near future, however. Now on order for U. S. ownership are 50 tankers, 45 of them over 26,000 tons, to be completed by 1950, and 20 additional 20-knot tankers, each of 24,000 tons, are scheduled under the national defense program sponsored by the Navy, Army, Maritime Commission and industry committee.

Still a Bugaboo

THE black market in steel apparently is as big as it ever was—perhaps bigger.

Very large quantities of pipe have recently been offered petroleum operators at prices from $260 to $280 per ton, the latter just about double the mill list price.

Oilmen charge that much of the undercover movement of oil pipe is directed by men in responsible positions in the steel mills, acting without the knowledge of their companies. The steel industry, itself, has consistently refused to set up any distribution pattern which would curb black marketing.

Producers say that aside from the offers of pipe they are receiving, the evidence is conclusive that much is being diverted from the regular channels of trade. The supply houses, they point out, while getting more steel than heretofore are not by any means getting their proportionate share of the increased production.

In many instances, producers with fixed drilling programs have been forced to buy billets from one mill and hunt around for another with capacity to fabricate pipe. The additional cost of this method runs from 50 to 100 per cent.

The net result of this situation is to make wells unduly expensive, even in this period of high wages and high prices. It is estimated roughly that materials represent 50 per cent of the cost of a well; steel that costs 100 per cent above mill prices, accordingly, adds 50 per cent to the cost of completion and tends to that extent to put inflationary pressure under crude prices.

Report on Lobbyists

LOBBYING is now big business, and a report on enforcement of the Lobbyist Registration Act of 1946, circulating in the Department of Justice but not yet made public, is understood to estimate that oil interests are spending approximately $70,000 on legislative matters affecting the industry which came up at the last session of Congress.

A special unit which has been investigating lobbies since early this year has been transferred to the Criminal Division, with indications that the drive against violators of the registration act will be intensified. The unit's work so far has resulted in indictments of members of two groups active in attempts to influence legislation, and the case of at least one other group soon will be laid before a federal grand jury.

One of the indictments so far returned is expected to develop into a test of the constitutionality of the act, but department officials declare there is no doubt of its validity, pointing out that the Georgia constitution made lobbying a crime as far back as 1877.

The department report was prepared by Irving Kaufman, who formerly headed the special lobby in-

vestigating unit. Counsel for many large national organizations, he said, advised their clients they were not covered by the act and need not file statements, although officials or employes engaged in lobbying should do so. However, Kaufman added, after conferences with these organizations, including the American Petroleum Institute and the Independent Natural Gas Association of America, registrations increased materially.

Credit Where Due

THE United States finally has decided to come out from behind the iron curtain of anonymity and tell the people of Europe that the goods they receive to speed their recovery is supplied by this country, cutting off a vehicle for Communist propaganda.

Everything markable, from the goods themselves to the shipping cases in which they are sent, will bear an emblem of stars and stripes and an identifying phrase.

In this way, the people of the 16 Marshall Plan countries may realize the extent of the help being given by the United States, it will be possible to follow the goods and check on their end use, and the Communists will be prevented from claiming that American goods really are being supplied by Russia, as they have in some instances in the past.

During the days of UNRRA, American relief going into some of the eastern European countries acquired markings somewhere along the road that indicated it was being supplied by Russia. Quite recently, grain seized from German growers in the Russian zone was prepared for the much-advertised "relief" of Berlin in sacks marked to indicate it originated in Russia.

There has been criticism that while the United States is spending billions of dollars to rehabilitate Europe, millions of Europeans have no idea where these supplies are coming from, and it is easily possible for the Communists to claim the credit. The effectiveness of the recovery effort, it has been suggested, could be increased materially by convincing European John Does and Mary Does that the United States not only preached recovery but practiced it.

Ten Firms to Cooperate With Bureau Of Mines in Shale Experiments

WASHINGTON.—A cooperative arrangement whereby the Bureau of Mines will supply oil shale and shale oil for tests and experimentation by 10 organizations which, in return, will make available to the bureau full information on the results of their work was announced this week by Director James Boyd.

Boyd extended an invitation to other interested companies or institutions to enter into similar arrangements, designed to speed up the development of economical commercial methods for producing liquid fuels and other products from shale.

Under the new arrangement, approximately 1,250 tons of shale and 320 bbl. of oil are being shipped from the bureau's mines and demonstration plant near Rifle, Colo., to the Sinclair Refining Co., New York; Standard Oil Development Co., New York; Union Oil Co. of California, Los Angeles; Socony-Vacuum Oil Co., Paulsboro, N. J.; Shell Development Co., San Francisco; Phillips Petroleum Co., Bartlesville, Okla.; General Aniline & Film Corp., New York; Montana State College, Bozeman; Gulf Research & Development Co., Pittsburgh; and Godfrey L. Cabot, Inc., Boston.

Boyd explained that each of the 10 organizations has requested samples of shale oil for refining and other tests on its conversion into useful products. In addition, Sinclair Refining Co., Standard Oil Development Co. and Union Oil Co. also are obtaining shale for research on the development of practices for extraction of the oil. Sinclair's work will be done at the newly completed laboratories at Harvey, Ill.; Standard's at Baton Rouge, and Union's at Wilmington, Calif.

The agreement stipulates that the cooperating organizations shall furnish data on the results of their tests and experiments and shall keep the bureau informed of any important developments that may arise. Either party may publish information relating to the economic evaluation of the test results, but detailed engineering and technical data shall be treated as confidential and will not be published without the written consent of the cooperator.

The cooperating organizations are to pay all transportation expenses on the shale or oil from the bureau operation at Rifle and furnish containers for the oil and for shale when taken in less than carload lots.

While the Government is setting up its own facilities for the production of oil from shale, bureau officials are eager to have industrial organizations, colleges, and other bodies undertake independent research so as to benefit from any new methods that may be developed. At the same time, the bureau is arranging to furnish material to private organizations for refining, pipe-line transportation, and other research.

France Gets Bulk of New Oil Allocations

WASHINGTON.—The Economic Cooperation Administration announced last week the granting of authorizations for purchase of petroleum and products by the Marshall Plan countries aggregating in excess of $6,650,000, bringing total commitments for oil under the European recovery program to $117,000,000.

Nearly half of the week's oil commitments went to France—$2,300,000 for crude from Venezuela and $1,260,000, later cut back by $119,000, for crude from the United States.

Other commitments included $162,500 to Bizone Germany for crude from Venezuela and $563,300 for crude from Iran, all to be purchased by the U. S. Army; $245,000 to Denmark for fuel oil from the Netherlands West Indies and $955,000 for products from the United States (a previous commitment for products from Venezuela was cut back by $111,816); $743,000 to the Netherlands for petroleum products from the United States, and $660,000 to Norway for products from the Netherlands West Indies.

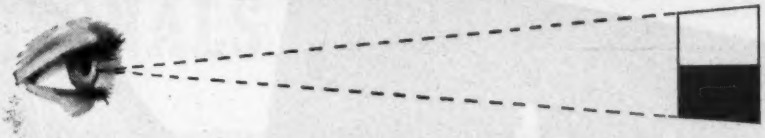
Wright, Martin Address Sunray Employes' Event

The management of the Sunray Oil Corp. on August 27 was host to employes of the company's recently acquired refinery at Duncan, Okla. Approximately 800 employes including families were present at the barbecue. C. H. Wright, president, and F. L. Martin, vice president in charge of the company's refinery operations, spoke briefly.

A description of the refinery including changes by the new owners appeared in The Oil and Gas Journal, August 26, 1948, issue, page 137.

The refinery was originally built as a war plant under the name of the Associated Refineries, Inc., in which companies operating eight refineries in North Texas and South Oklahoma participated. The basic engineering was done by the Universal Oil Products Co. which is also the licensing agent for the catalytic cracking, alkylation and isomerization processes.

The refinery division of the Jones-Laughlin Supply Co. did the design and detailed engineering work and built the plant. The Universal company is now supplying technicians to train Sunray employes in the operation of the refinery.



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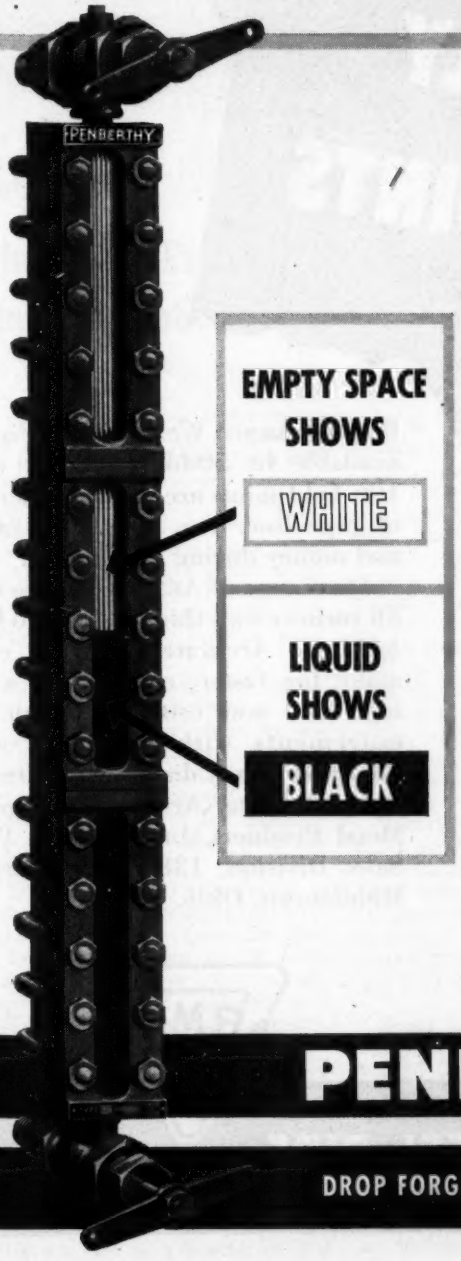

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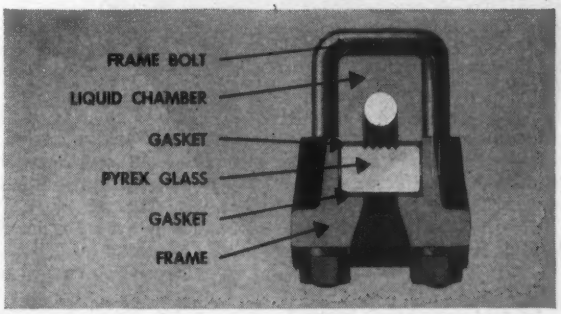

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PERSONALS

Paulus Heads Extensive Refining Operations

THE recent dedication ceremonies and inspection tour of the new 25,000-bbl. daily fluid catalytic cracking unit of the Sugar Creek, Mo., refinery of Standard Oil Co. (Ind.) further emphasizes the strong position held by this company in refining operations, not only in the Midwest but also in the Rocky Mountain area. Head of this company's refining operations is Dr. Max G. Paulus, vice president in charge of manufacturing for Standard of Indiana since 1933.

Paulus joined the company as research chemist at its Whiting, Ind., refinery in 1915 after receiving his doctor's degree at Johns Hopkins University. After 4 years in laboratory work, he was assigned to plant operation in charge of the pressure still department and later the crude stills.

In 1921, Paulus was transferred to Casper, Wyo., as assistant superintendent of plant No. 1. Later the same year he was appointed to the same position at the Casper plant of the Midwest Refining Co. operated as a subsidiary by the parent company, and a year later was made superintendent. He was appointed general manager of the Rocky Mountain division in 1927.

Paulus was transferred to the Chicago general office as assistant general manager of all manufacturing activities of the company in 1931, and later the same year was made manager. He was elected a director in 1932 and a year later named to the position that he now holds.

J. H. Osborne, for 4 years gravity-meter party chief for Stanolind Oil & Gas Co., has been named division gravity-meter supervisor for the company's Rocky Mountain division with headquarters in Casper, Wyo.

Ray V. Hennen, chief geologist for Hiawatha Oil & Gas Co., has opened temporary offices in Midland, Tex., and the company is awaiting completion of a new building there to establish its permanent offices.

Earl L. Moser has been named industrial relations manager of the Washington division of General Petroleum Corp., Los Angeles, Calif., to succeed **John C. Naye,** who will go to the Southern California division as assistant credit manager.

L. M. Woodward, assistant secretary of Derby Oil Co., Wichita, Kans., has been elected assistant secretary of the Northwest Central State Gasoline Tax Administrators at the recent annual conference in Butte, Mont.

T. L. Tiernan, formerly assistant superintendent of the Allen, Okla., refinery of Sunray Oil Corp., has been named manager of the refinery to succeed **Dewey Vinson,** who has been transferred to the company's Duncan refinery. Other promotions within the Allen plant include: **Ault Milne,** former stillman, to plant superintendent. **Luther Jones** and **Edgar Dean,** both former stillmen, to assistant superintendents; **Carl F. Kile,** formerly a treater, to foreman of treating, blending, and loading racks; and **Herman C. Kraettli,** formerly engine mechanic, to mechanical foreman.

Robert P. Dean, formerly credit manager for Esso Standard Oil Co. of Pennsylvania at Philadelphia and later transferred to New York as assistant credit coordinator, has been appointed credit coordinator in the marketing department of Esso Standard Oil Co.

Roger L. Messman, formerly stratigraphic drill foreman for Continental Oil Co. in West Texas, has been named district geologist to be in charge of the new Kansas district geological headquarters at Wichita. The headquarters are being moved from Ponca City, Okla. Messman succeeds **C. L. Arnett** as Kansas district geologist. Arnett was advanced to division geologist at Ponca City.

James Watson, formerly secretary of Sterling Products Co., Easton, Pa., chemical manufacturers and more recently controller of Bishop Enterprises, Summit, N. J., has joined Oil States Petroleum Co., New York, as assistant to the president, **Charles T. Faas.**

Fred Johnson, sales manager of Suburban Propane Gas Corp.'s New Jersey office, has been promoted to district manager of the Whippany district to succeed **Charles Burnham,** who has been appointed manager of the Suburban district in Derby, Conn.

S. A. CLICK

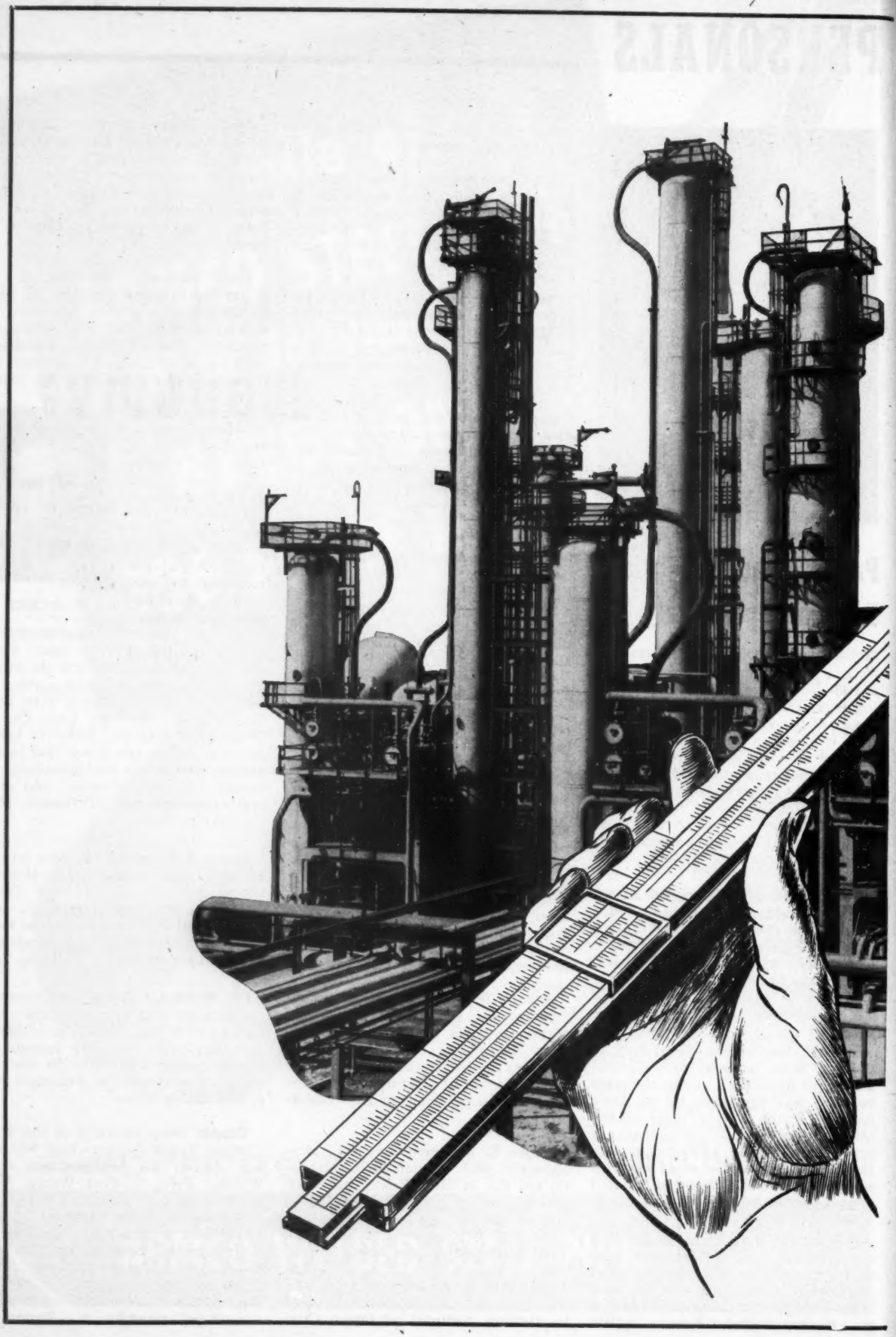
Samuel A. Click, superintendent in the East Texas field for Illinois Pipe Line Co. of Texas (subsidiary of Ohio Oil Co.), has been named general superintendent of the company to succeed **R. N. Montgomery,** vice president and general superintendent, who is retiring after 39 years' service with the company and its affiliates. Click, who has been associated with Ohio Oil Co., Illinois Pipe Line Co., and Illinois Pipe Line Co. of Texas since 1922, will make his headquarters in Houston. Since 1942 Montgomery has been a vice president, assistant treasurer, director, and general superintendent of Illinois Pipe Line Co. of Texas.

Henry E. Meadows has been named division civil engineer for Humble Oil & Refining Co. in West Texas and Southeast New Mexico. He succeeds **Virgil A. Walston** who has been promoted and moved to the company's general headquarters at Houston, Tex.

Dr. Michael J. Rzasa, who received his doctor's degree in chemical engineering from the University of Michigan last year, has been named research group supervisor in the research department of Stanolind Oil & Gas Co. in Tulsa.

Donald Gray, operator of the West Central Texas Sample Log Service, has moved his headquarters from Wichita Falls to Fort Worth, Tex.

Gordon C. Locke, attorney for the Interstate Commerce Commission, has resigned to become executive secretary and associate counsel to the Committee for Pipe Line Companies, Washington representation, it was announced recently by Bruce C.



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Clardy, committee chairman. The Committee for Pipe Line Companies represents pipe lines subject to the jurisdiction of the Interstate Commerce Commission and is not connected with any trade associations.

E. R. Baker, formerly director of development of Emery Industries, Inc., Cincinnati, Ohio, and widely experienced industrial chemist and wartime assistant research chief in chemical warfare, has been appointed manager of Continental Oil Co.'s newly created Central Research Laboratories. Baker received his bachelor's degree in chemistry from Yale University and remained there for three additional years in the Yale Graduate School.

Arthur T. Everham has become assistant to **H. S. Lipp,** manager, Midwestern Contractors, Inc. Everham was formerly with Natural Gas Pipeline Co. of America and Everham-Aldridge, pile driving contractors, Kansas City, Mo.

Claude A. Mulkin, foreman of United Natural Gas Co.'s Hampton field in Pennsylvania, has retired effective September 1 after 46 years of service with the company.

H. M. Cooley, Bethlehem Steel Co., has been named chairman of the publicity committee for the spring meeting of the Mid-Continent district division of production of the American Petroleum Institute to be held in Tulsa, March 23-25.

Dr. Saul Winstein, professor of chemistry at the University of California, will receive the $1,000 American Chemical Society Award in pure chemistry. Presentation will be made at the society's 114th national meeting in St. Louis, Mo., September 6.

M. P. L. Love, director of research at Shell Oil Co., Inc.'s Wood River, Ill., refinery, has been named research department manager in the company's New York head office. He will coordinate and direct all manufacturing research programs in the company's territory east of the Rocky Mountains. Love joined Shell in 1935 as junior chemist at the Wood River refinery. He was named chief research chemist at Shell's Houston laboratories in 1942, and research director in 1943. **R. J. Greenshields,** chief engineer at the Wood River laboratories, has been named to succeed Love as research director there.

K. F. Krammes, geologist for The Texas Co. in the Bakersfield, Calif., area, has been promoted to district geologist there to succeed **L. B. Snedden,** who has been transferred to Houston, Tex., as assistant manager of the geophysical division, producing department. Prior to his joining Texaco Krammes first was with Union Oil Co. of California as junior geologist and then as geologist with Superior Oil Co. from 1937 to 1940.

John W. Glahan, formerly landman for Warren Oil Corp. at Monroe, La., will establish a Permian Basin headquarters for the company in Midland, Tex.

S. Fred Shaw, gas-lift specialist of San Antonio, Tex., will spend 2 months in Turner Valley, Alta., Canada, carrying on investigations for various oil companies.

E. W. Price, formerly senior geologist in the Oklahoma City division office, has been named district geologist in Stanolind Oil & Gas Co.'s district office there. Price is a graduate of the University of Wichita and has been with Stanolind since 1936. He succeeds **G. H. Galloway,** who was recently named central division geologist.

E. C. Clark, Jr., district civil engineer in the Lovell Lake district for Humble Oil & Refining Co., has been transferred to the Sugar Valley district as district civil engineer. He succeeds **R. C. Newsome,** who resigned. Other recent changes among the supervisory personnel of Humble's production department: **C. J. Hopper,** civil engineer, Gulf Coast division office, transferred to the Lovell Lake district to Clark's former position; **D. M. Griffiths,** associate civil engineer, Maubro district, transferred to the same position in the Gulf Coast division; **R. F. Wipke,** associate civil engineer, Gulf Coast division office, transferred to the Imogene district as associate civil engineer; and **B. D. Strawn,** civil engineer, Gulf Coast division office, to the Louisiana division in New Orleans as civil engineer.

Charles Ise has joined the Midland, Tex., district office of Southern Minerals Corp. as assistant to **Ellis H. Scobey,** district geologist for the area.

John J. Willenburg, assistant area superintendent for Stanolind Pipe Line Co., has been promoted to superintendent in charge of all the company's operations in Illinois and Indiana effective September 1. Willenburg succeeds **C. E. Scneder,** who retired last month after 31 years active service with the company. Illinois-Indiana headquarters will continue to be at Galesburg, Ill.

J. D. Wheeler, Michigan division manager, for Ohio Oil Co., and **Don F. Rayburn,** Arenac County, Michigan, independent producer, have been elected to the State Oil Advisory Board for 3-year terms.

E. C. McGurren, division manager of Skelly Oil Co. at Chicago, was elected chairman of the Illinois Petroleum Industries Committee for the coming year, succeeding **H. G. Swanson,** division manager of Shell Oil Co., Inc., who has held the post for the past 2 years.

W. C. Bryant, group leader in the research department for Swan-Finch Oil Corp. for the past 2 years, has been named chief research chemist of the company.

Col. Ernest O. Thompson, chairman of the Texas Railroad Commission, has been named to succeed Lt. Gen. Preston A. Weatherred as commander of the Texas National Guard.

Derek Allan Hough has been appointed general secretary of the Institute of Petroleum, London, and **George Sell** has been named editor of the Institute's publications.

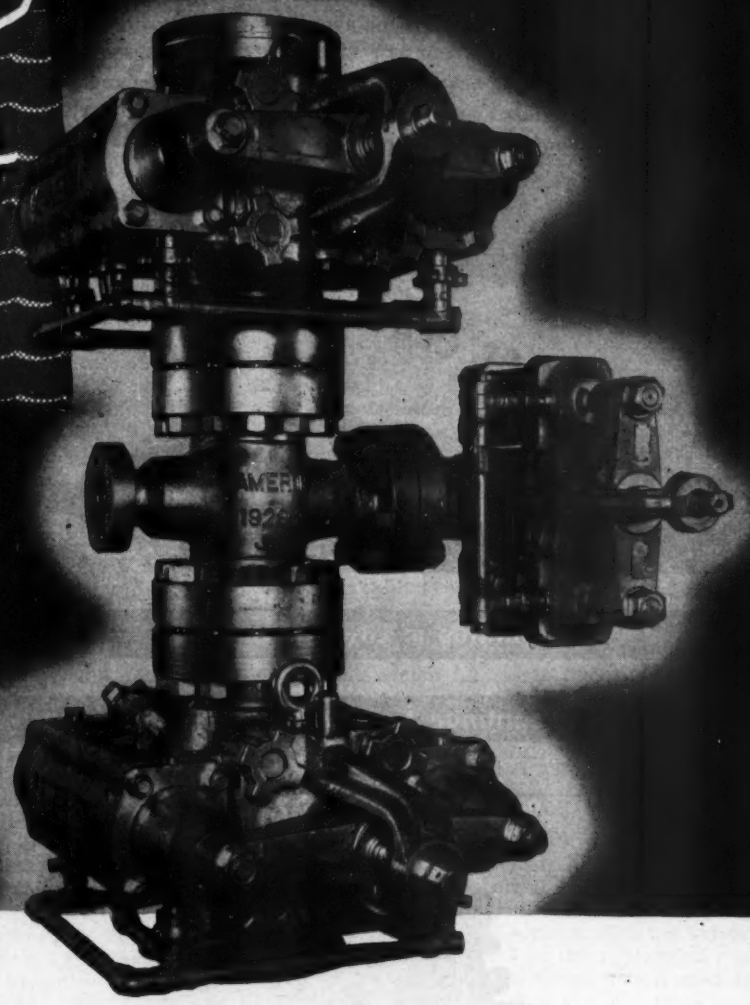
Guy I. Warren, Corpus Christi, Tex., will succeed **H. J. Porter,** retiring president of the Texas Independent Producers and Royalty Owners Association September 12.

J. S. Morse, who has been on a special assignment in the head office marketing department for Shell Oil Co., Inc., has been appointed manager of the head office marketing plant department. A graduate of Massachusetts Institute of Technology, Morse has been with Shell since 1932. **C. P. Woodward,** acting manager of the marketing plant department, succeeds Morse as operations manager of the Cleveland marketing division. **E. B. Collins** has been named office manager of the Cleveland marketing division succeeding **T. W. Eysenbach** who has retired.

I. A. McAninch, for 22 years in the controller's department for General Petroleum Corp., Los Angeles, has been named president of the Toastmasters International.

W. P. Duncan, Jr., formerly assistant district landman in Midland, Tex., for Magnolia Petroleum Co., has been named district landman for the company's West Texas district with headquarters in Midland. He succeeds

Safety at Sea!



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CONTACT CLAYS

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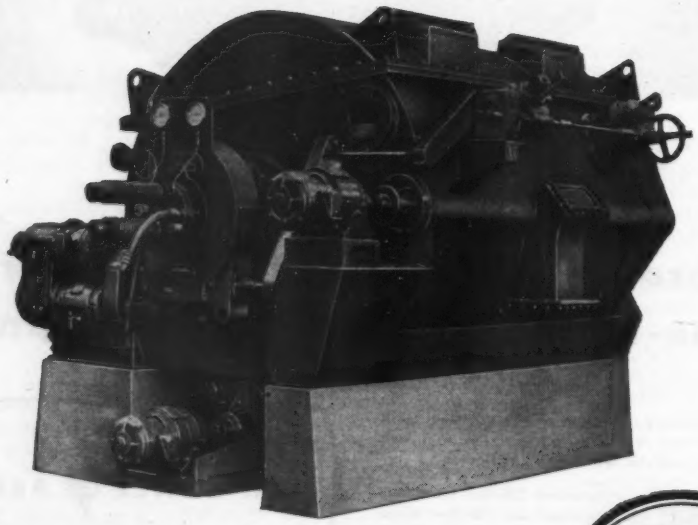
?? ??



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John T. Jones who has been transferred to Oklahoma City as district landman in that area. Jones succeeds **C. L. Lanier,** who has resigned. **Fred G. Goodman,** formerly scout in West Texas for Magnolia, has been named assistant district landman.

Francis A. Reilly, examiner for the Federal Petroleum Board, has been transferred from Kilgore, Tex., to take charge of the board's office in Houston.

W. W. Phillips, former assistant district superintendent for Humble Oil & Refining Co. in the production department in the London, Tex., district, has been made superintendent at Gladewater. He succeeds **N. N. Jones** who has been transferred to the Andrews district in the West Texas division where he will be district superintendent. **P. L. McGee,** assistant district superintendent at Pickton, has been transferred to the London district to replace Phillips.

Other promotions and transfers of Humble production-department supervisory personnel during the first half of August were: **E. J. Stanley,** roustabout, London district, promoted to the Gulf Coast division office in Houston as junior civil engineer; **Norman Newsome,** associate petroleum engineer, petroleum-engineering division, Houston, promoted to petroleum engineer in the Friendswood district; **J. O. Coburn,** tool pusher, Galveston Bay district, transferred to the Lovell Lake district; **T. O. Allen,** formerly senior petroleum engineer in the Gulf Coast division office, to senior petroleum engineer in the petroleum-engineering division, Houston; **J. E. Bray,** junior civil engineer, East Texas division, Tyler, transferred to the Gulf Coast division office, Houston; **G. K. Myrhaugen,** district civil engineer, transferred from Avery Island, La., to Bayou Sale, La.; **W. M. Satterwhite,** toolpusher, transferred from Avery Island to Eucutta; **E. A. Bullington,** district civil engineer, Bayou Sale, transferred to the Louisiana division office in New Orleans; and **W. H. Arnold,** toolpusher, from Hub, Miss., to Grand Isle.

SHIFTS—

D. F. Wint, foreman, Continental Oil Co., Greeley, Colo., to Buffalo, Wyo.; **Wayne Ewing,** superintendent, Rocky Mountain Drilling Co., Bell to Riverdale, Calif.; **S. S. Gifford,** superintendent, Rocky Mountain Drilling Co., Inglewood to Ventura, Calif.; **Bruce A. Eckerson,** engineer, California Research Corp., Whittier to Pomona, Calif.

Carlos M. Ferguson, geologist, Magnolia Petroleum Co., Amarillo to Abilene, Tex.; **J. F. Peery,** foreman, McCarthy Oil & Gas Corp., Benavides to Angleton, Tex.; **Wayne R. Bright,** engineer, Stanolind Oil & Gas Co., Brownfield to Lubbock, Tex.; **C. W. Hemmi,** geologist, Petty Geophysical Engineering Co., Houston, Tex., to Junction City, Ark.; **Mauritz Swenson,** engineer, Railroad Commission of Texas, Houston to Abilene.

C. H. John, engineer, Celanese Corp. of America, Kingsville, Tex., to Chickasha, Okla.; **G. W. Frank,** engineer, Phillips Petroleum Co., Odessa, Tex., to Jackson, Miss.; **G. A. Gresham,** superintendent, Helmerich & Payne, Inc., Odessa, to Sterling City, Tex.; **W. B. Slaughter,** superintendent, McCarthy Oil & Gas Co., Orange to Angleton, Tex.

John Kaleta, foreman, Fluor Corp., Ltd., Pasadena, Tex., to Billings, Mont.; **John R. Feeser,** engineer, Stanolind Oil & Gas Co., Sundown to Brownfield, Tex.; **David C. Capps,** superintendent, Amerada Petroleum Corp., Vernon to Longview, Tex.; **J. R. Jackson, Jr.,** geologist, Humble Oil & Refining Co., New Orleans, La., to Los Angeles, Calif.; **William Holbert,** superintendent, Stanolind Oil & Gas Co., Shreveport, La., to Oklahoma City.

W. D. Conley, superintendent, Union Producing Co., Vivian, La., to Elk City, Okla.; **E. V. Hunt,** engineer, Ford, Bacon & Davis, Inc., Owasso to St. Joseph, Mich.; **T. L. Cantrell,** engineer, Gulf Oil Corp., Lansdowne, Pa., to Chesapeake City, Md.; **C. W. McClain,** foreman, Amerada Petroleum Corp., Wellington, Colo., to Casper, Wyo.; **Richard W. Love,** foreman, The Texas Co., Wichita, Kans., to Salem, Ill.; **Kenneth G. Redman,** geologist, Phillips Petroleum Co., Bartlesville, Okla., to Wichita, Kans.; **Howell L. Phillips,** chemist, Sunray Oil Corp., Duncan, Okla., to El Dorado, Kans.; **John L. Carlson,** engineer, Anderson-Prichard, Oil Corp., Tulsa to Carthage, N. Y.

DEATHS

Harry C. Wiess, 61, one of the original founders and for 11 years president of Humble Oil & Refining Co., died August 26 at his home in Houston. He was one of the industry's best known executives. Wiess began his oil career soon after graduating from Princeton in 1909. For 14 years prior to becoming vice president of Humble in 1933, Wiess guided the company's refining activities. The Baytown refinery was built under his direction as well as many of Humble's marketing facilities. In 1937 Wiess was named president of Humble. In December 1944 he received the Mid-Continent Oil and Gas Association award as the industry executive making the greatest contribution to the war effort during that year.

Carl M. Cox, 62, formerly commissioner of public lands for Wyoming in charge of oil and gas conservation matters, and later a member of Wyoming's oil states advisory committee in 1931-1933, died August 18 in Denver.

John A. Nieding, 66, a director and attorney for Cumberland Petroleum Co. and secretary and director of Cumberland Gasoline Corp., died August 26 in Cleveland, Ohio.

Robert E. Lee Jordan, Sr., 65, independent oil operator in the Mid-Continent area and the first person to file a claim with the federal Government to the submerged coastal lands of California, died August 22 in Washington.

William W. Lanahan, 64, a director of Mid-Continent Petroleum Corp., died August 30 in Providence, R. I.

George Caldwell, about 42, driller, was killed August 29 near Lindsay, Okla.

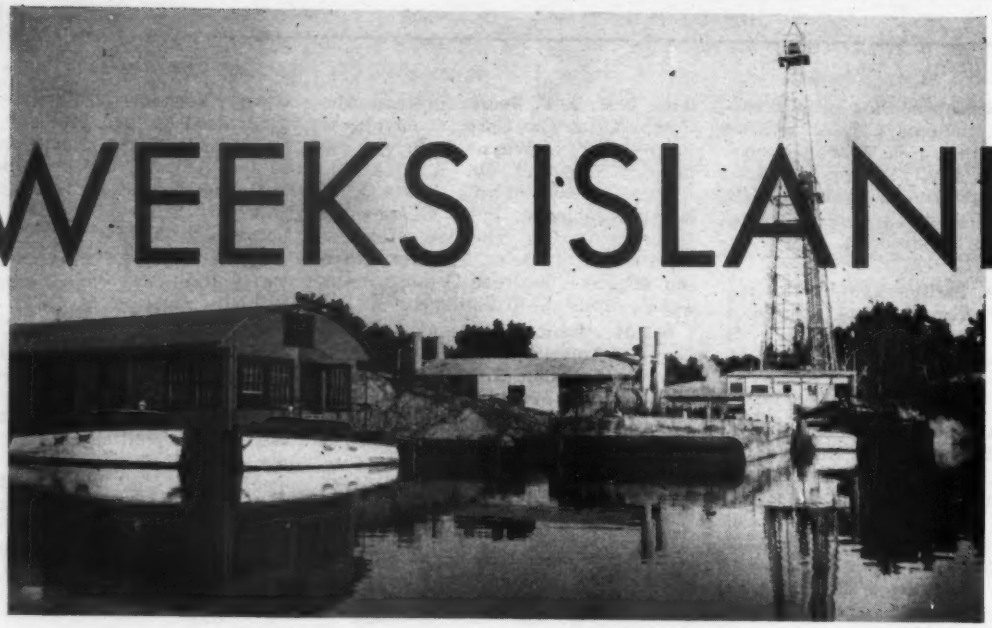
John Reid, 73, retired industrialist and former director of the American Petroleum Institute, died August 28 in Oil City, Pa. He was responsible for many inventions and practices now in general use throughout the oil industry.

J. H. Croft, 69, Fort Worth and Midland, Tex., oil operator and partner in the Peck & Croft Drilling Co. and in Peck & Croft Production Co., Midland, died August 23 in Fort Worth.

Herbert Miller Knight, 83, a retired civil engineer who had applied for a patent on an invention for drilling oil in tidal lands, died August 18, in Upper Montclair, N. J.

William P. Keegan, 82, retired independent oil operator of Oklahoma, died August 30 in Tulsa.

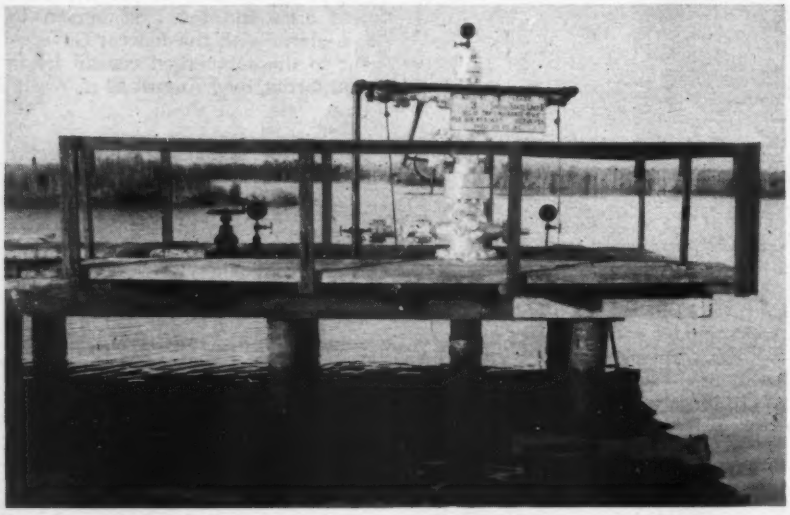
WEEKS ISLAND



Above: Drilling operation on north flank of Weeks Island salt dome. Shown is Shell Oil Co., Inc.'s, Carl E. Lee barge-mounted steam rig. Crew quarters and field office are housed on barge at left foreground. Below: Shell's 3 Smith-State, second deepest well at Weeks Island, producing from total depth of 13,888 ft. Deepest well, recently completed, produces from total depth of 14,040 ft.

Salt-Dome Operations

by Neil Williams



ONE of the most interesting development operations on the Gulf Coast is that under way around the flanks of the Weeks Island salt dome in Iberia Parish, Louisiana, where important oil production is being proved up in sands extending in depths below 14,000 ft. Not only is Weeks Island one of the last of the older known salt domes to be found productive, but the production until recently has been the deepest in the world. Even now, the producing depths of the lower wells are exceeded commercially in only one instance and only by a relatively narrow margin which may be eliminated shortly by continued extension of development at this dome to successively lower levels.

Development at Weeks Island is being carried on in three different sectors, located on the north, west, and southeast flanks, respectively. Most extensive and deepest development has been on the north flank where the discovery well was completed in April 1945. In this sector, Shell Oil Co., Inc., the only operator, now has nine wells ranging in producing depths from 12,423 to 14,040 ft. Except for the initial test, which, abandoned at 11,510 ft., was not drilled deep enough to reach the productive horizons, there have been no dry holes. Currently, two rigs are kept running in the area.

Four Sands at Weeks Island

Four productive and potentially productive sands have been logged in this sector. They lie within a depth interval of approximately 900 ft., and are identified locally, in order of their depths, as the R, S, T, and U sands. So far, oil production has been found only in the upper two sands, in which all wells to date have been completed. Most wells have been drilled to the T and U sands but at their locations these sands have been encountered within their respective gas phases. It is assumed, however, that further down structure and away from the dome they also will be found to have oil zones.

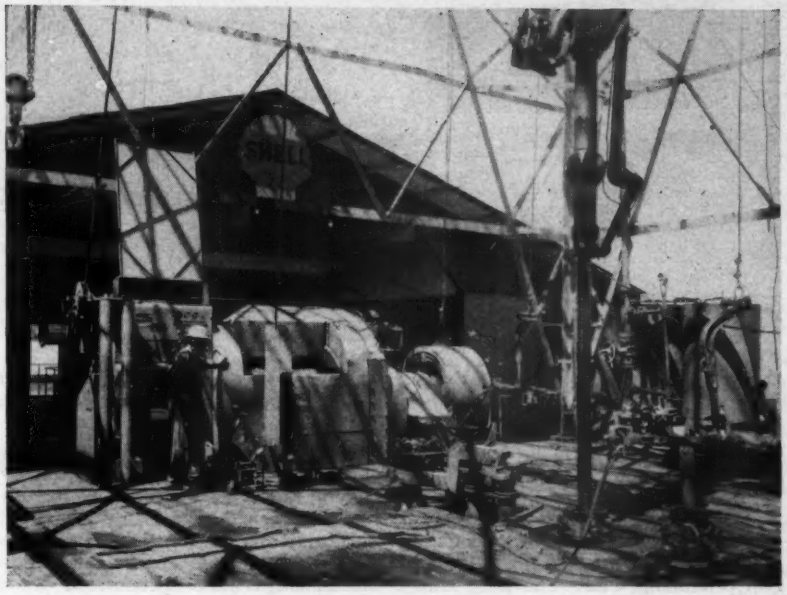
Top of the R sand at the lowest structural position so far drilled is at 13,828 ft., or 1,425 ft. below the top in the highest well, where the sand still is within its oil zone. The sand ranges in thickness from about 30 ft. in the highest well to 116 ft. in the lowest well, and at its greatest depth it still is above water. At this location, the S sand, in which the

well was completed, was topped at 14,015 ft., and with the indicated gas-oil contact at approximately 13,750 ft., it has a proved oil column of at least 625 ft. Although only the top 25 ft. to a depth of 14,040 ft., was taken in when the well was completed, the sand is approximately 330 ft. thick. As in the case of the R sand, no indication of water was shown, which leaves the downdip limits of production undefined. Base of the sand at approximately 14,345 ft. is 38 ft. lower than the total depth of the present deepest producing well in the world.

At this location, where the hole was drilled to a total depth of approximately 14,750 ft., the T and U sands were found at depths of around 14,490 and 14,675 ft., respectively. The former is about 35 to 40 ft. thick and the latter 60 to 70 ft. If oil zones exist in these sands their depths probably will approach or exceed 15,000 ft. In either sand, it is possible that a gas well could have been completed.

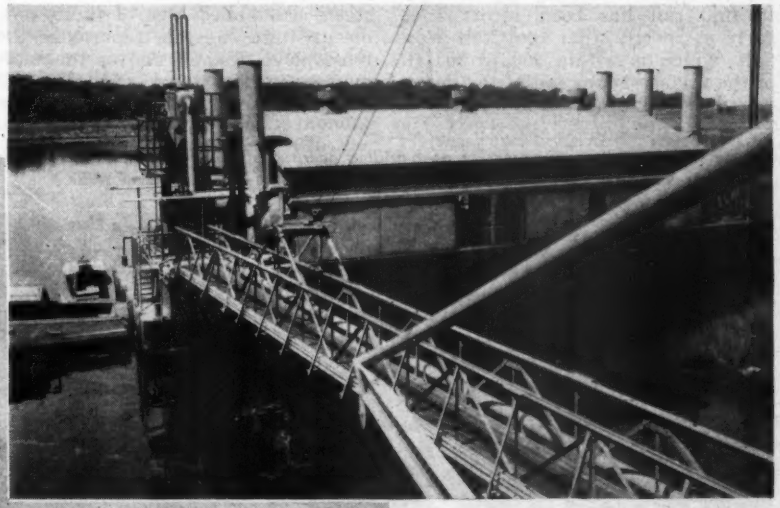
Where the S sand is found above the gas-oil contact, completions are made in the R sand, which, as previously stated, so far has carried only oil. At lower locations, the practice is to complete in the S sand. Of the nine wells to date, four are producing from the latter sand and five from the R sand. As yet, no dual completions have been attempted. Wells so far completed have had initial flows of from 300 to 500 bbl. daily through small chokes with tubing pressures of from 2,000 to 2,400 psi. Gravity of the oil is approximately 34° A.P.I.

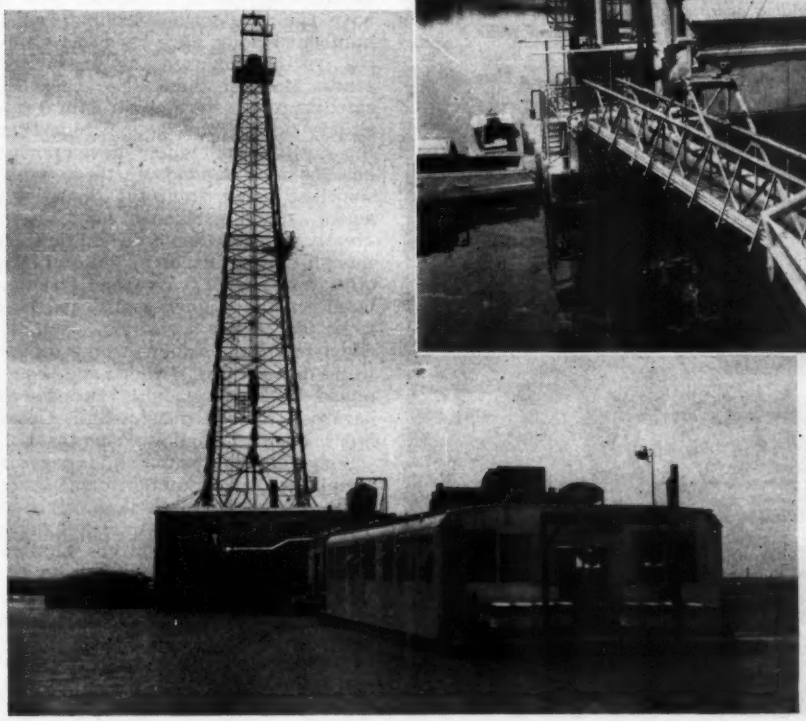
On the west flank, about 2 miles around the dome, where production



Derrick floor of Shell's E. N. Van Duzee barge-mounted steam rig operating on north flank of Weeks Island salt dome. This rig is claimed to be one of largest in world. Driller is A. T. Wood

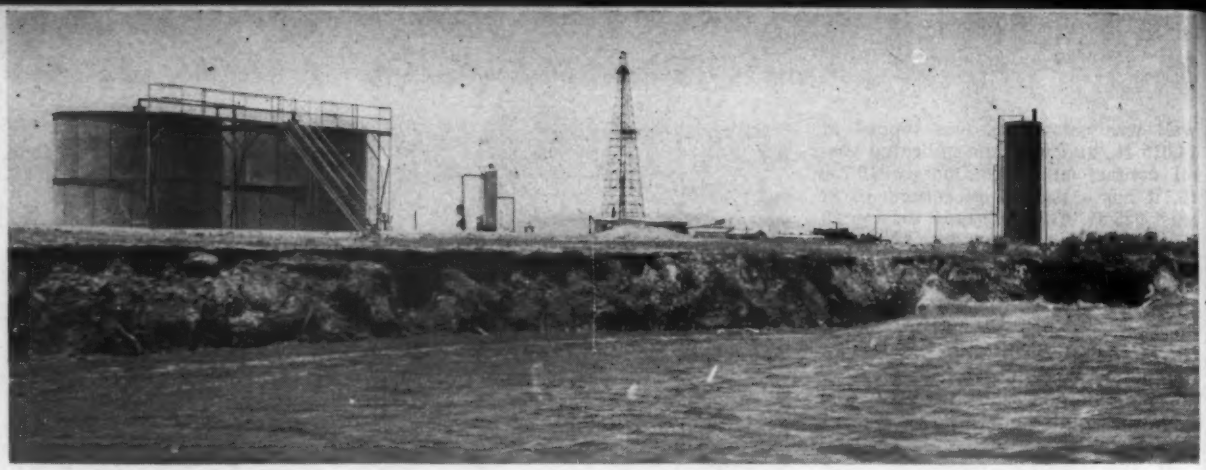
was opened in June 1947, four producing wells have been completed, two by Shell and two by Humble Oil & Refining Co. Sands in this sector have been found at somewhat shallower depths than on the north side. The discovery well was completed at 9,460 ft., the second at 9,155 ft., the third at 8,500 ft., and the fourth at 8,904 ft. In this area, unusually difficult drilling conditions, to be discussed later, have resulted





Above: Boiler barge on Shell's E. N. Van Duzee rig used in deep drilling on north flank of Weeks Island salt dome. Installation includes five 150-hp., 350-psi. working pressure boilers

Left: Humble Oil & Refining Co.'s large diesel-electric drilling barge operating in west flank sector of Weeks Island salt dome



Humble lease battery on bank of Intercoastal Canal on west flank of Weeks Island salt dome. Drilling rig (center background) is mounted on barge located in dredged canal leading off Intercoastal Canal at right

in the abandonment of two other tests. At present, Humble has one rig operating in this sector.

The third sector is on the opposite or southeast side of the dome where Humble, the sole operator, has two producing wells. The first, completed in September 1947, is producing from a sand at a total depth of 11,705 ft., while the second well is at a depth of 13,367 ft. In this area, two holes have been lost because of formational and mechanical difficulties. An additional test is now drilling.

Weeks Island on the surface is a large domal-shaped mound rising 135 ft. above the surrounding marshes. On it, shallow drilling in attempts to find salt has been recorded as early as shortly after the Civil War. Salt, which is within 200 to 300 ft. of the surface at the top of the dome, was discovered in 1897, and has been mined commercially since 1902. Until the present development was undertaken, however, exploration for oil had been confined to a relatively few early-day shallow tests on top of the dome in which no appreciable sands or showings were encountered.

Reaching for Drill Sites

Surface locations at structural positions where the deep sands are encountered lie in the marshes at the sides of the mound and are reached only through natural and dredged waterways. On the west side they extend into the open water of Weeks Bay. Drilling has called for the use of barge-mounted rigs. Both of Shell's two rigs on the north flank are large steam assemblies. One of these, now on its third hole, is reportedly the most powerful and one of the most modern in the world. *(See The Oil and Gas Journal, March 11, 1948, page 17).* Humble's two rigs include a large steam assembly on the southeast flank, and a diesel-electric job on the west flank.

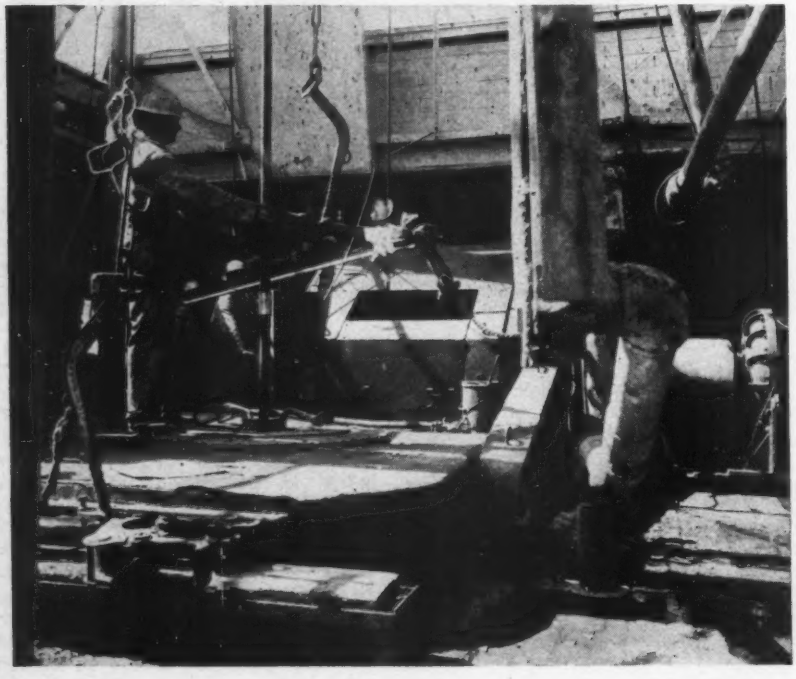
As on the flanks of most piercement-type salt domes, formations are steeply tilted. Particularly at the structural locations close to the dome where these formations have been badly gouged by the salt intrusion, their drilling has presented problems in keeping holes straight and preventing key seating, sticking of pipe and twistoffs. Not only have numerous fishing and sidetracking jobs been occasioned, but, because of the depths drilled, the difficulties and hazards involved have been much greater than those ordinarily encountered at most other domes. These have added substantially to drilling time and well costs.

Greatest difficulties have been experienced in wells on the west and southeast sides of the dome. Nearly all wells drilled in these two sectors have run into serious trouble and a number of holes have been lost without getting down to the productive sands. Most of these have been located at relatively high structural positions within the gouge zone. On the north flank, where development has been extended further down structure away from the dome and gouge zone, problems have been greatly reduced. Some difficulties, although not as serious as those on the other two flanks, have been encountered in the higher wells, particularly the earlier wells, but at more downstructure locations, some of the wells have been drilled and completed with less trouble and fewer hazards than in many Gulf Coast areas, even at shallower depths.

Some of the trouble and hazards encountered in a number of the early wells on the north flank have been minimized in later drilling by changes which Shell, the operator, has initiated in its casing and mud programs. Changes in the casing program have involved the use of much longer strings of surface pipe than before and elimination of long intermediate protection casing. All of Shell's wells

(Continued on page 89)

Fishing jobs have been numerous in deep-drilling operations at Weeks Island. Here, crew is running pipe to wash over stuck drill stem in one of Shell's deep wells



Knock Characteristics

Of 16 Pure Gaseous Hydrocarbons

by Fred E. Frey,* Robert V. Kerley,† and Wheeler G. Lovell‡

Measurements have been made of the knock tendency of almost all of the gaseous hydrocarbons. Measurements reported here have been made in a normally aspirated and in a supercharged engine under a variety of conditions similar to those of other investigations. The knock characteristics, which range in critical compression ratios from 5 to 15 or in relative performance numbers from 60 to 300, may be correlated with molecular structure. Isomeric compounds, and even those in which the isomerism is in the position of a double bond, may vary greatly in tendency to knock. The stereoisomers showed no significant difference. The olefins may be superior or inferior in knock rating to the corresponding paraffins, and their relative value is greatly influenced by engine conditions. The effectiveness of lead in the compounds varies over a several-fold range.

THE earliest studies of the knocking tendency of fuels in internal combustion engines established that different hydrocarbons vary widely in knocking characteristics. As work in this field progressed, evidence was accumulated which demonstrated that each individual hydrocarbon responds differently to changes in engine conditions. This made it desirable to build a fundamental engine evaluation picture of hydrocarbons through the selection of many pure hydrocarbon species and to evaluate each under a variety of engine conditions. Realizing the value of such information, the American Petroleum Institute has sponsored such a program.

In cooperation with the A.P.I. project, the range of hydrocarbons studied has now been extended downward to include nearly all of the known normally gaseous hydrocarbons, and this study is the subject of the present paper. Thirteen pure hydrocarbons of four or fewer carbon atoms were supplied by Phillips Petroleum Co. and one by Ohio Chemical & Manufacturing Co. These were subjected to extensive engine tests by the research laboratories of General Motors Corp. and the research laboratories of Ethyl Corp. under a range of conditions essentially the same as those covered in testing the A.P.I. Research Project 45 hydrocarbons.[4]

This paper also reports data on two compounds, 1-butyne and 2-butyne, obtained by A.P.I. Research Project 45 in the same engines and under identical conditions. These data are included through the courtesy of A.P.I. Research Project 45 and its director, Cecil E. Boord, in order to make the data on this group of gaseous hydrocarbons more complete.

Methods of Test

The knocking characteristics of the materials were evaluated in 3 engines and under as many as 16 different operating conditions, as follows:

1. By determination of the critical compression ratio for audible knock of the straight material in the General Motors variable compression single-cylinder engine. This engine, of overhead-valve construction, 3¼ by 4½ in., first described in 1930[3], is equipped with evaporative cooling and a simple carburetor, and may be operated conveniently under a wide variety of conditions from very "mild" to very "severe." The incidence of knock is detected audibly and also with an indicator connected to a cathode-ray screen.

The engine was operated with mixture ratio for maximum power and the spark timing which gives maximum power with liquid fuels, under four sets of conditions.

R.p.m.	Jacket ° F.	Intake air ° F.
600	212	100
600	350	150
2,000	212	100
2,000	350	150

These conditions correspond to those used in the A.P.I. program previously mentioned, except that a gas carburetor was used and the fuels were introduced to the carburetor as gases.

2. By determination of the knock-limited indicated power output in the Labeco 17.6 supercharged engine. This engine, 2⅝ by 3¼ in., of 17.6 cu. in. displacement with overhead valves, may be run with a variable amount of supercharge pressure and with mechanical fuel injection into the inlet air.

The different operating conditions included 20° spark and 5.6 compression ratio and:

R.p.m.	Jacket ° F.	Air ° F.	Fuel-air ratio
900	300	125	0.07
900	300	125	0.10
900	300	225	0.07
900	300	225	0.10

These conditions also correspond to those used in the A.P.I. program except that the compounds were introduced into the inlet air as gases. Where possible the compounds were also tested when introduced into the inlet air as liquids; and when this was done all but propane were also tested with the addition of tetraethyl lead in a concentration of 1.0 ml. per liquid gallon.

3. By measurement of octane number by research and motor methods in 20 per cent concentration by volume in a base fuel composed of 60 per cent isooctane (2,2,4-trimethylpentane) and 40 per cent n-heptane.

Source of Hydrocarbons

The hydrocarbons, supplied by Phillips Petroleum Co., were of high quality. The purity percentage as determined by conventional methods, is tabulated within Table 1.

The impurity in each was principally a hydrocarbon of neighboring boiling point, which, in the amount present, should have shown no appreciable effect on the knock rating. In the case of 1,2-butadiene the impurity was appreciable and was mainly butenes. The two 2-butene isomers contained primarily the other

*Phillips Petroleum Co., Bartlesville, Okla.; †Ethyl Corp., Detroit; ‡General Motors Corp., Detroit.

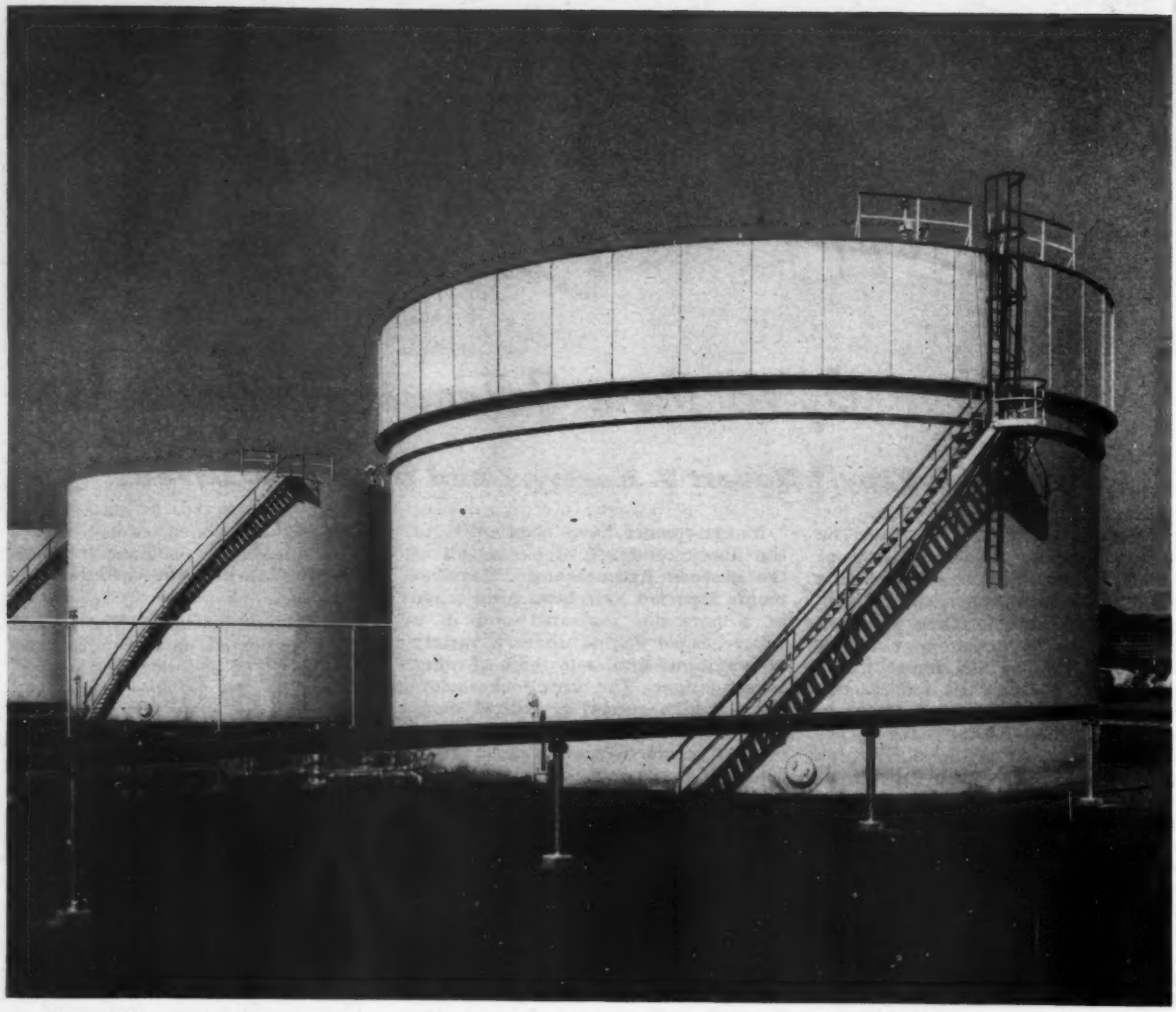


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TABLE 1—KNOCK RATINGS OF PURE GASEOUS HYDROCARBONS

A.S.T.M. engine— General Motors engine—

TABLE 1—KNOCK RATINGS OF PURE GASEOUS HYDROCARBONS

Hydrocarbons	Purity, mol (%)	A.S.T.M. engine—Octane numbers 20 per cent solution in 60-40 octane heptane blend: F-1 Oct. No.	F-1 Blending Oct. No.	F-2 Oct. No.	F-2 Blending Oct. No.	General Motors engine—Critical compression ratios and equivalent octane numbers of gases: 600 r.p.m. 212° J.T. 100° air	2,000 r.p.m. 212° J.T. 100° air	600 r.p.m. 350° J.T. 150° air	2,000 r.p.m. 350° J.T. 150° air	Supercharged 17.6 engine—Per cent of power of isooctane and equivalent octane numbers: Gases 125° air 0.07	Gases 125° air 0.10	Gases 225° air 0.07	Gases 225° air 0.10	Liquids 125° air 0.07	Liquids 125° air 0.10	Liquids 225° air 0.07	Liquids 225° air 0.10	Liquid + ICC $P_BE_{T_4}$ 225° air 0.07	Liquid + ICC $P_BE_{T_4}$ 225° air 0.10	A.S.T.M. engine—Data of pucket Octane number F-1	F-2	F-3
Methane	99.0	....	....	....	....	12.6	15.4	13.0	†10.4	314	....	310	....	....	....	....	....	....	....	....	....	....
Ethane	98.2	....	....	....	....	>*6	>*6	>*6	>*6	>*6	....	>*6	....	....	....	....	....	....	....	....	>*6	>*6
Propane	99.94	....	....	....	....	12.4	9.7	9.4	7.2	310	....	305	....	....	....	....	....	....	....	*4.6	*0.05	99
n-Butane	99.85	70.6	113	70.7	114	12.2	9.0	*1.4	*0.1	>*6	....	>*6	....	136	202	121	221	....	....	*1.9	97.1	*0.08
Isobutane	99.37	72.4	122	72.1	121	8.0	8.45	6.45	6.5	96	103	96	99	101	102	98	100	134	136	*0.17	97.6	*0.02
Cyclopropane	99.5	....	....	....	....	*0.2	97	100	94	99	*0.05	99	100	100	*0.05	100	100	*1.6	*1.9	....	....	....
Ethylene	99.02	....	....	....	....	11.5	....	6.7	....	112	....	97	178	145	....	103	294	....	....	....	....	....
Propylene	99.0	....	....	....	....	*3.7	....	*0.1	....	*0.3	....	100	>*6	*3.1	....	*0.1	>*6	....	....	....	....	....
Isobutylene	97.3	81.9	170	75.8	139	8.5	6.5	5.6	4.25	93	119	76	97	....	....	....	....	....	....	*0.03	75.6	....
1-Butene	99.8	76.7	144	73.2	126	10.6	7.85	6.9	5.7	88	180	101	166	108	203	80	197	....	....	*0.24	84.9	77.5
2-Butene	96.6	78.9	155	73.9	130	*2.0	*2.0	*0.1	86	97	>*6	0.05	>*6	0.15	>*6	93	>*6	....	....	....	....	....
High boiling isomer	....	....	....	....	....	10.6	9.1	8.0	6.25	111	156	85	150	128	175	105	150	151	....	*0.26	88.1	87.6
2-Butene	96.4	78.4	152	73.6	128	*2.0	100	*0.5	92	*0.2	>*6	96	*5.7	*1.0	*6.0	*0.1	*5.7	*3.9	....	....	....	....
Low boiling isomer	....	....	....	....	....	7.1	6.4	5.3	4.8	71	97	65	87	77	106	66	95	101	146	....	....	....
1,3-Butadiene	99.62	87.1	196	76.8	144	8.5	6.55	5.35	4.5	97	104	55	69	68	128	64	110	74	128	....	....	....
1,2-Butadiene	94.6	....	....	....	....	*0.4	96	94	63	79	*0.10	77	88	87	*1.1	85	*0.25	90	*1.0	....	....	....
1-Butyne	(A.P.I.)	....	....	....	....	....	....	3.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....
2-Butyne[5]	(A.P.I.)	71.1	115	71.8	119	5.8	....	66	....	....	....	....	....	....	....	....	....	....	....	*0.03	75.6	....
		....	....	....	....	91	....	4.25	....	....	....	....	....	*37	....	*35	....	33	53	....	....	....
		....	....	....	....	5.25	....	81	....	....	....	....	....	<60	....	<60	....	<60	79	....	....	....
		....	....	....	....	85	....	4.15	....	....	....	....	....	....	51	....	49	....	51	....	....	....
		....	....	....	....	....	....	79	....	....	....	....	....	....	68	....	70	....	72	....	....	....

*Equivalent ml. $P_BE_{T_4}$ in isooctane. †Approximate. J.T.—Coolant jacket temperature. (1) At 0.064—F/A. no knock. (2) At 0.059—F/A. (3) At 0.063—F/A. (4) At 0.078—F/A. (5) Tested as a liquid.

isomer as impurity, but both isomers have so nearly the same characteristics in the engine that the effect of such contamination on the ratings should be small. The cyclopropane was a commercial product, obtained through A.P.I. Research Project 45. The 1-butyne and 2-butyne were prepared by A.P.I. Research Project 45 at Ohio State University Research Foundation under the supervision of Cecil E. Boord and were of high purity.

Previous Data

The most extensive data in the literature on the gaseous hydrocarbons are those of Puckett[9] who measured the octane numbers of 10 gaseous hydrocarbons in the C.F.R. engine by the F-1 (research), F-2 (motor) and F-3 (aviation) procedures, except that the materials were introduced into the inlet as gases. These data are included with the new data in Table 1. In addition there are many other data on the knock ratings; many different engines and test procedures were used, often the standard test conditions were modified, and in some instances the hydrocarbons available for testing were impure.[1,5,6,7,8]

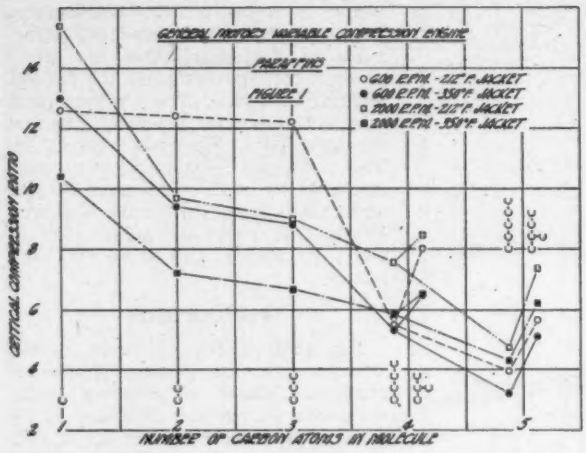
New Data

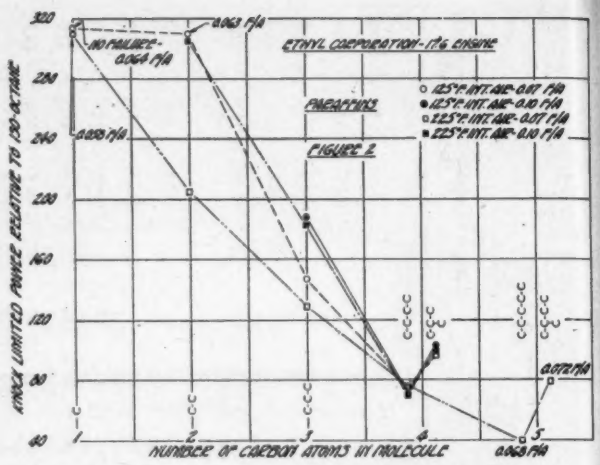
All the new data, which have been obtained with the three different engines and under as many as 16 different operating conditions, are tabulated in Table 1. There are some blanks in the table because the physical or knocking properties of the materials made measurements difficult or impossible, or because of limited amounts of material available.

The data are expressed in terms of the original measurements as far as possible. Blending octane numbers have been computed for the solution measurements. The critical compression ratio measurements as well as the supercharged power measurements are also expressed in terms of equivalent octane number or as tetraethyl lead-in-isooctane. In considering such equivalents for the compression-ratio measurements, it should be remembered that the power output for some of the gases may be lower that the power output obtained at the same compression ratio with the standard liquid fuel due to absence of vaporization effects of the liquid fuel in the induction system resulting in lower air flow with the gases.

General Level of Antiknock Quality

Paraffins.—One of the primary objects of interest in the gaseous hydrocarbons as fuels is the general level of antiknock quality. In order to obtain a general picture of their behavior, their antiknock value (in terms of critical compression ratio in the naturally aspirated engine and in terms of knock-limited indicated power in the supercharged engine) has been plotted against number of


GENERAL MOTORS VARIABLE COMPRESSION ENGINE
PARAFFINS
FIGURE 1
600 R.P.M. - 212° F. JACKET
600 R.P.M. - 350° F. JACKET
2000 R.P.M. - 212° F. JACKET
2000 R.P.M. - 350° F. JACKET
CRITICAL COMPRESSION RATIO
NUMBER OF CARBON ATOMS IN MOLECULE


ETHYL CORPORATION - ITG ENGINE
PARAFFINS
FIGURE 2
125° F. INT. AIR - 0.07 F/A
125° F. INT. AIR - 0.10 F/A
225° F. INT. AIR - 0.07 F/A
225° F. INT. AIR - 0.10 F/A
NO FAILURE - 0.063 F/A
0.063 F/A
0.072 F/A
KNOCK LIMITED POWER RELATIVE TO ISO-OCTANE
NUMBER OF CARBON ATOMS IN MOLECULE

carbon atoms in the molecule in Figs. 1 and 2 respectively.

Both sets of data, for four sets of engine conditions each, support the conclusion that the gases show a range of behavior about as wide as exhibited by hydrocarbons which boil in the gasoline range. There likewise appears to be a fairly regular decrease in antiknock quality from methane to pentane (data on compounds higher than the butanes are obtained from the A.P.I. Research Project data[4]) which varies a little with the particular conditions of test. The change from the straight to the branched structure in the butanes results in an increase in value very similar to the differences between n-pentane and iso-pentane.

Olefins.—Similar pictures for the olefins and cyclopropane are shown in a like manner in Figs. 3 and 4. Here, the variation in knocking characteristics is not as great as for the paraffins, since the olefins of three-carbon atoms or less are lower in rating than the corresponding paraffins while those of above four-carbon atoms are higher. Among the four-carbon-atom olefins, individuals may be above or below the corresponding paraffins, depending upon the particular engine conditions under which they are burned. Cyclopropane is better than propylene under mild engine conditions, worse under severe conditions.

The gaseous 1-olefins, like the gaseous paraffins, show a fairly regular decrease in value with increase in length of molecule, with the conspicuous exception of ethylene which is almost always inferior to propylene. The change in double bond from the 1- to the 2- position results in an increase in antiknock value under all conditions. The branching of the chain in going from 1- to 2- butene to isobutylene also is accompanied by an increase in value. The 1,3-butadiene may be either better or worse than 1-butene, depending upon the engine conditions.

The difference between the knock behavior of the cis- and trans-isomers of 2-butene is very small and almost within the experimental error. There is only a single test on 1,2-butadiene, and it appears considerably inferior to the isomeric 1,3-butadiene.

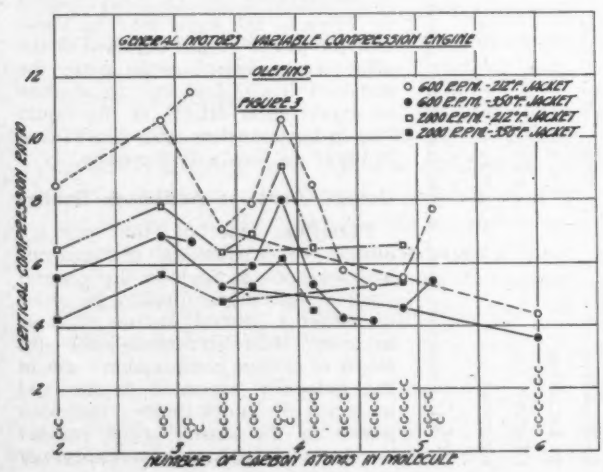
Acetylenes.—The two acetylenic compounds, 1-butyne and 2-butyne, are of interest in that the 2-butyne is lower than 1-butyne in antiknock value, while 2-butene is superior to 1-butene. Both acetylenic compounds are inferior to the olefins.

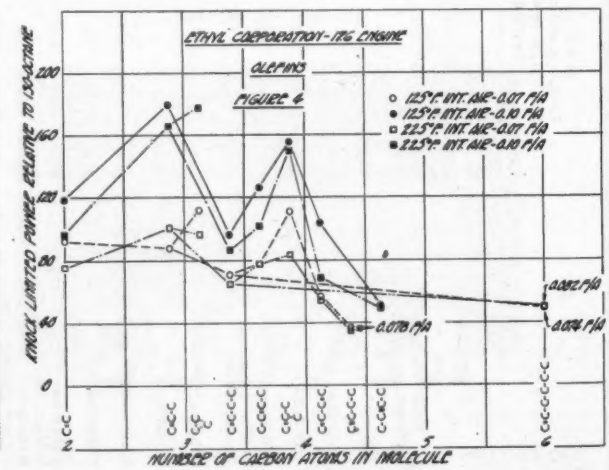
Sensitivity.—An important characteristic of the gaseous hydrocarbons as fuels is their sensitivity or the relative change in their antiknock value with change in engine operating conditions. In general, changes in engine conditions which tend to increase the temperature of the charge prior to combustion also tend to lower the relative values of those fuels which are termed sensitive.

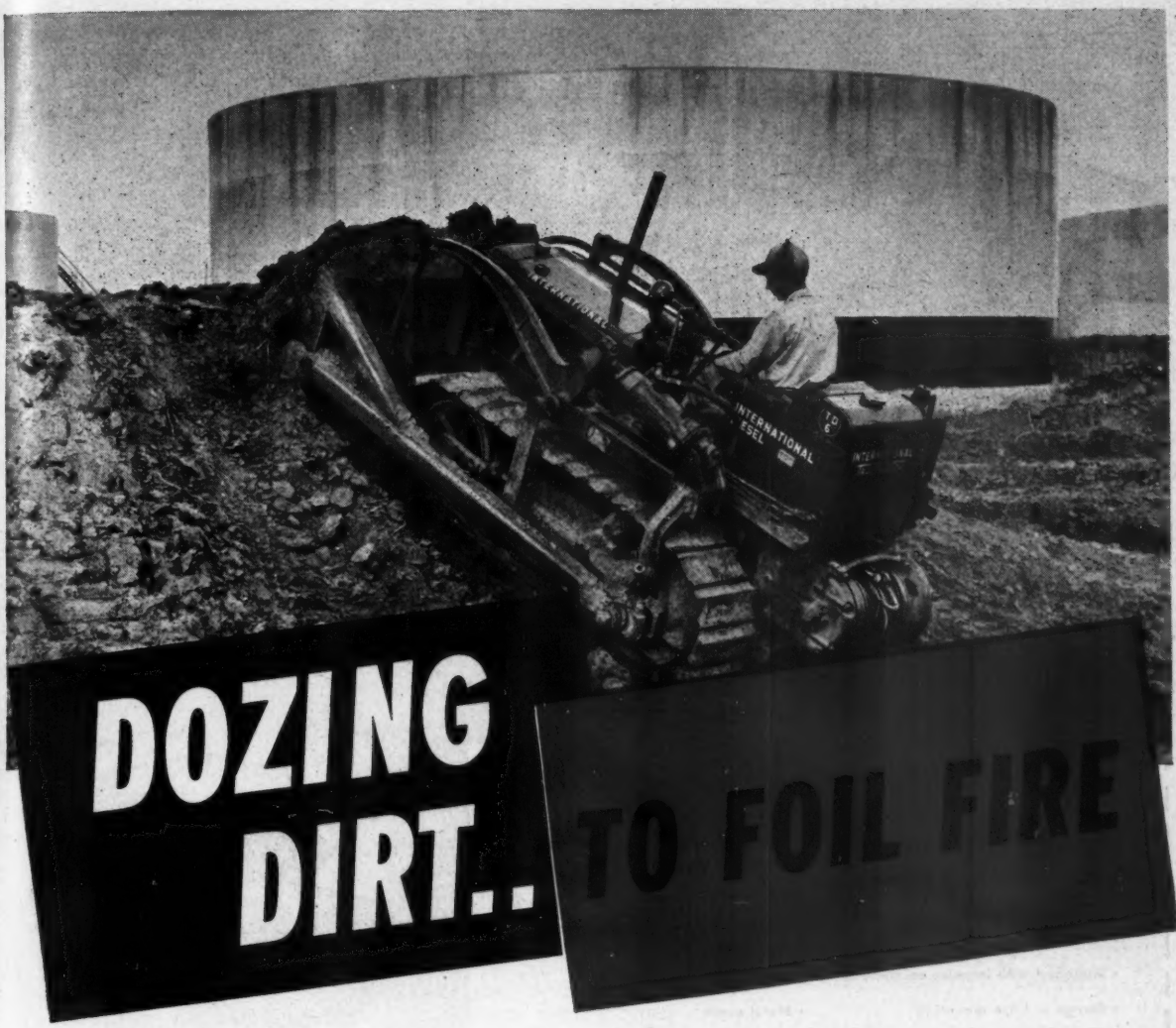
While the higher members of the paraffins are generally considered relatively insensitive as compared with the olefins, the lower paraffins become progressively more sensitive and may be as sensitive as the olefins. Cyclopropane appears more sensitive than propylene; 1,3-butadiene appears more sensitive than the butenes.

Introduction as Liquids and Gases

In the supercharged engine some of the materials were introduced into the engine inlet both as liquids and as gases. The technique for liquid injection proved to be difficult and tedious. Possibly because of this and also because of variations in latent heat, boiling point, and the possibility that some liquids reached their critical temperatures prior to injection into the air stream, the general significance of a comparison of liquid and vapor introduction is not very great. However, the liquid technique permitted the fuels to be blended with


GENERAL MOTORS VARIABLE COMPRESSION ENGINE
OLEFINS
FIGURE 3
600 R.P.M. - 212° F. JACKET
600 R.P.M. - 350° F. JACKET
2000 R.P.M. - 212° F. JACKET
2000 R.P.M. - 350° F. JACKET
CRITICAL COMPRESSION RATIO
NUMBER OF CARBON ATOMS IN MOLECULE


ETHYL CORPORATION - ITG ENGINE
OLEFINS
FIGURE 4
125° F. INT. AIR - 0.07 F/A
125° F. INT. AIR - 0.10 F/A
225° F. INT. AIR - 0.07 F/A
225° F. INT. AIR - 0.10 F/A
0.082 F/A
0.078 F/A
0.074 F/A
KNOCK LIMITED POWER RELATIVE TO ISO-OCTANE
NUMBER OF CARBON ATOMS IN MOLECULE



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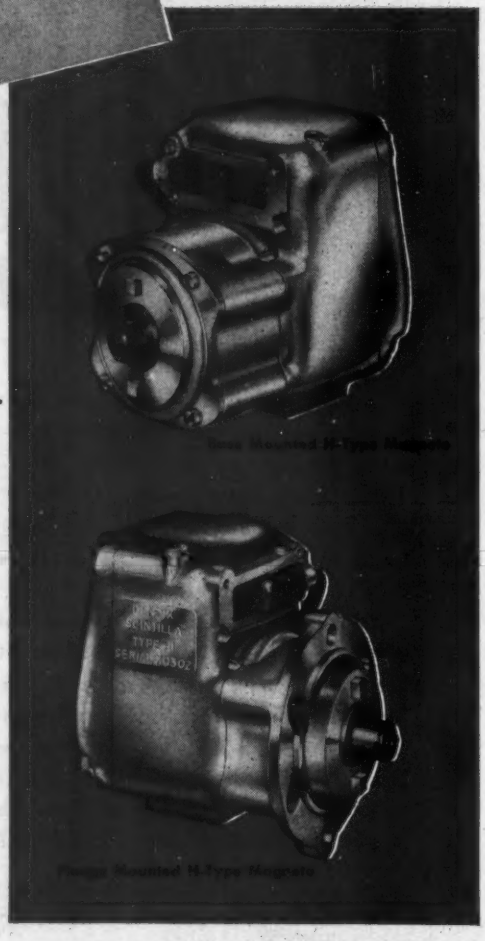

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tetraethyl lead except for propane in which it proved to be insufficiently soluble at the blending temperature of —60° F.

TABLE 2—RELATIVE EFFECTIVENESS OF TETRAETHYL LEAD
(17.6 Engine)

Hydrocarbon	Ratio* for 1.0 ml. TEL/gal. 0.07 F/A	0.10 F/A
Butane	1.75	1.42
Isobutane	1.37	1.24
1-Butene	1.96	1.83
2-Butene (H.B.)	0.70	1.41
2-Butene (L.B.)	0.70	1.28
Isobutylene	0.44	1.63
1,3-Butadiene	0.59	0.55

$$\text{Ratio}^* = \frac{\text{Percentage increase in knock limited output due to tetraethyl lead in test fuel}}{\text{Percentage increase in knock limited output due to tetraethyl lead in isooctane}}$$

Effectiveness of Tetraethyl Lead

The data on the effectiveness of tetraethyl lead in the gaseous hydrocarbons have been tabulated in Table 2. The unit chosen is the ratio of the percentage increase in knock-limited output of the leaded hydrocarbon to that of leaded isooctane.

Both butane and isobutane are compounds in which tetraethyl lead is considerably more effective than in isooctane. The mono-olefins are especially interesting because the effectiveness of tetraethyl lead in them ranges from almost twice as great as in isooctane to less than half as great. The effectiveness of tetraethyl lead in the mono-olefins at rich mixtures is much greater than at lean mixtures.

Blending Octane Numbers

In general, the value of the gaseous hydrocarbons in 20 per cent solution in a 60-40 isooctane-heptane mixture, and their blending octane numbers (or the octane number which the pure compound would have as computed from the 20 per cent concentration value if the actual number concentration curve were linear) show no very simple relationship to their engine behavior when tested unblended. The effectiveness of olefins in solution usually appears greater than might be expected by linear interpolation from their behavior unblended. However, the data in Table 1 indicate some correlation between the relative blending octane numbers of the olefins and the relative octane numbers of the pure compounds.

Correlations of Tests

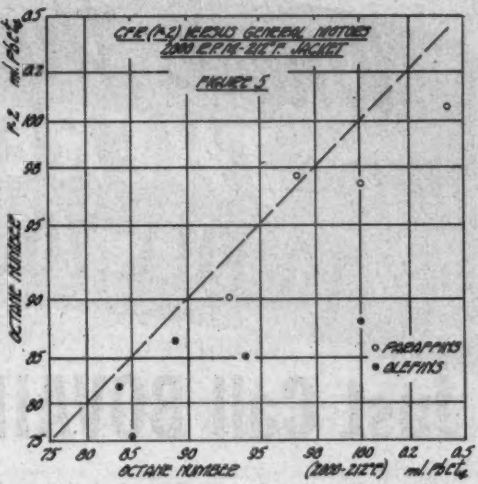
Since most of these hydrocarbons are very sensitive to engine conditions it is not to be expected that in tests in different engines exactly similar ratings will be obtained because the temperature-time-pressure conditions are not likely to be identical. However, it is of some interest to make comparisons of the three different engines to see what degree of correspondence may exist.

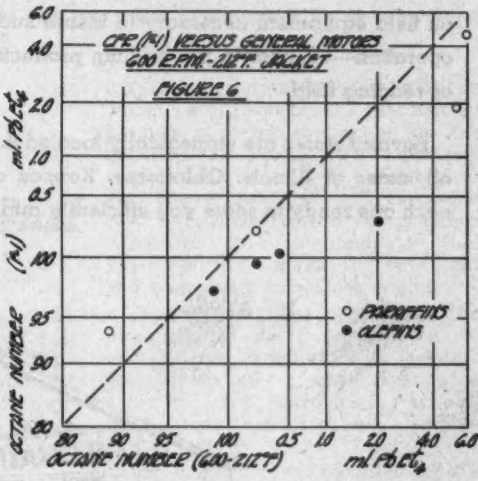
On the basis of other data, the General Motors engine under the 2,000-r.p.m. 212° F. conditions correlates best with the F-2 or motor method. The data for the gaseous hydrocarbons are plotted in Fig. 5 where the F-2 octane numbers (using the data of Puckett) are plotted against the equivalent octane numbers at 2,000 r.p.m. 212° F. The rating scale used in this and the following figures are proportioned on the basis of AN Performance Number in order to eliminate the discontinuity at 100 octane number. The correlation appears good, except for some olefins.

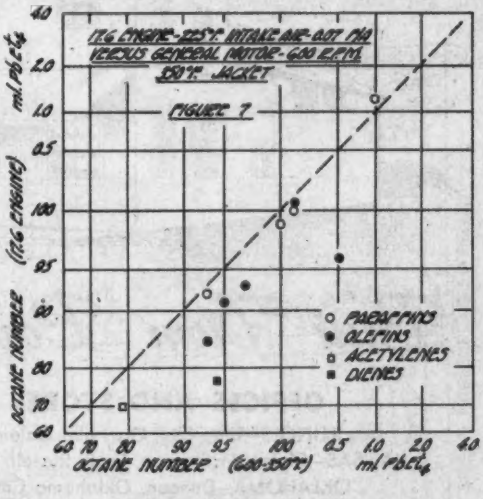
Similarly, because of the known correlation between the F-1 or research octane numbers and the 600-r.p.m. 212° F. data on the other compounds, this relationship is expressed in Fig. 6.

Finally, because of the correlation observed with other compounds between the 17.6 engine at 225° F.-0.07 F/A and the General Motors engine at 600-r.p.m. 350° F., such data for the gaseous hydrocarbons in terms of equivalent octane numbers are plotted in Fig. 7. With the exception of a few sensitive olefins, the correlation appears fairly good.

Consequently, within the range of deviation shown in Figs. 5-7, it is possible to correlate the ratings from one engine to another, provided the proper operating conditions for the different engines are used.







Acknowledgment

This work has involved the cooperation of three organizations and many individuals for whom the authors are representative only. From Ethyl Corp., A. E. Felt and Fred Gillig; from General Motors, B. A. D'Alleva and J. W. O'Donnell; and from Phillips Petroleum Co., A. W. Suderman and K. Proctor have contributed importantly in the obtaining of the data.

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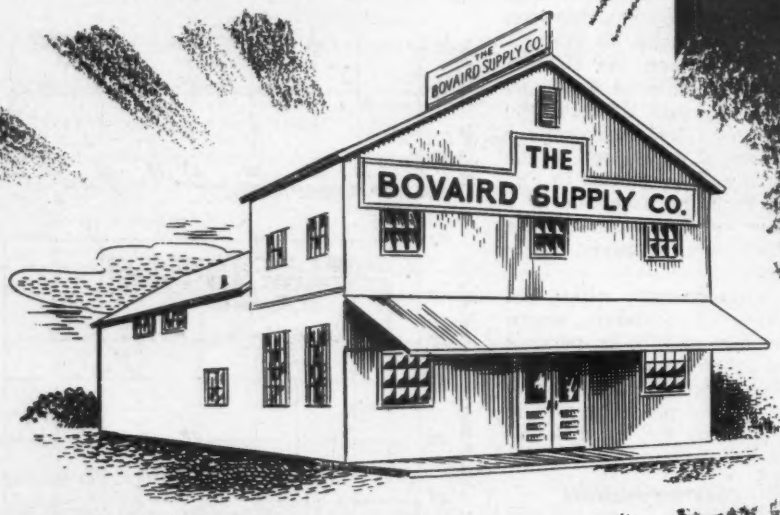

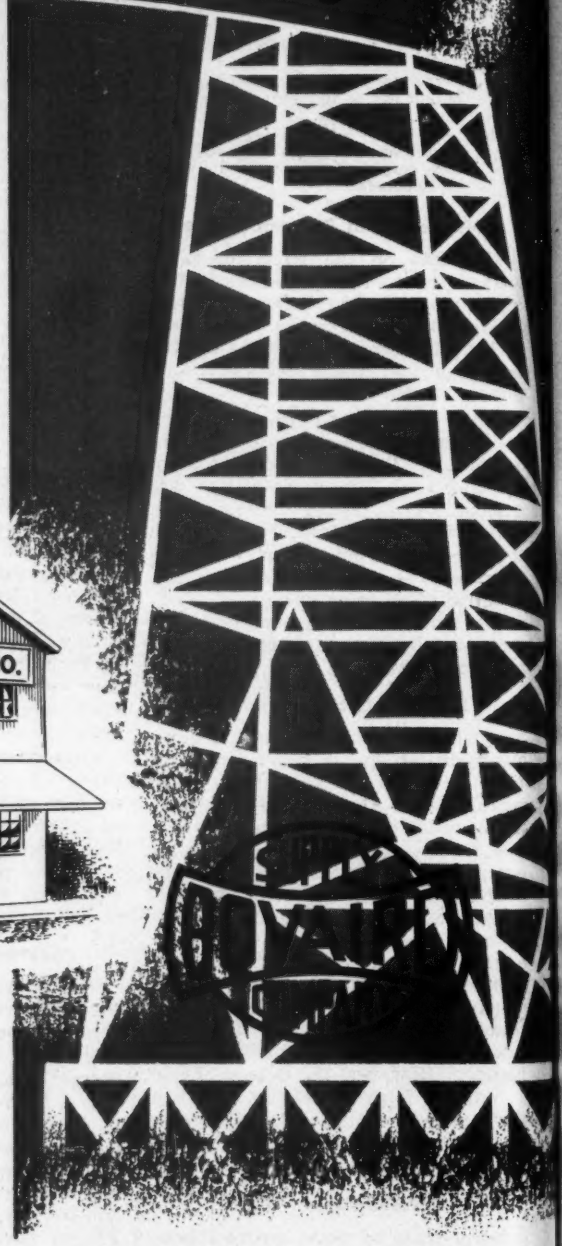

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GENERAL OFFICES TULSA, OKLAHOMA

This remote pipe-line station in northwest Colorado is equipped with four fuel vaporizers which are distilling fuel by utilizing the waste heat of the engine exhausts. The vaporizers are not designed to compete with natural gas where it is available at a reasonable cost, but for areas where natural gas is either expensive or unavailable. The four sheet-metal houses outside the pipe-line station proper house the vaporizers

Miniature Topping Plant

Develops Pipe-Line-Station Fuel

by Leigh S. McCaslin, Jr.

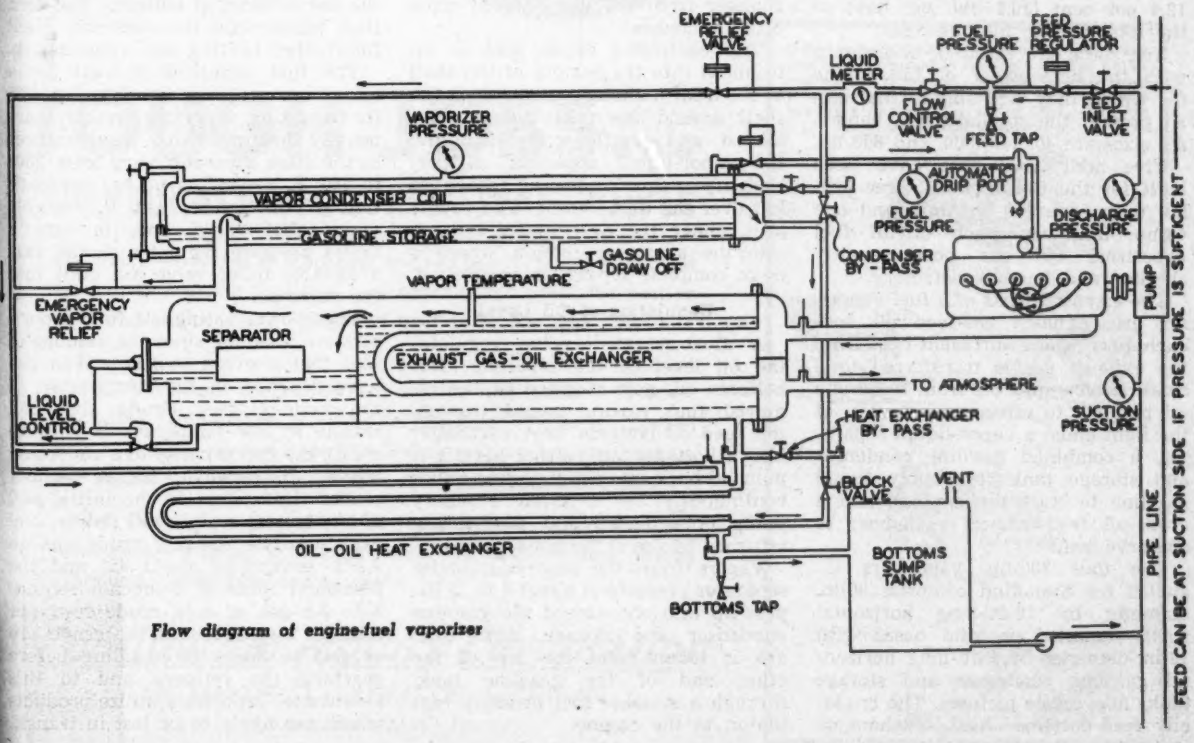
A MINIATURE automatic topping plant—known as a fuel vaporizer—has been developed to distill a fuel gas for gas engines from crude oil pumped by the engines. Vaporization of the fuel gas is accomplished by utilization of the waste heat of the engine exhausts.

Most recent installation of the fuel vaporizers is that for Stanolind Pipe Line Co. at its Sunbeam station 40 miles west of Craig, Colo. The Sunbeam station is on the line which moves crude from Rangely field into Wyoming.

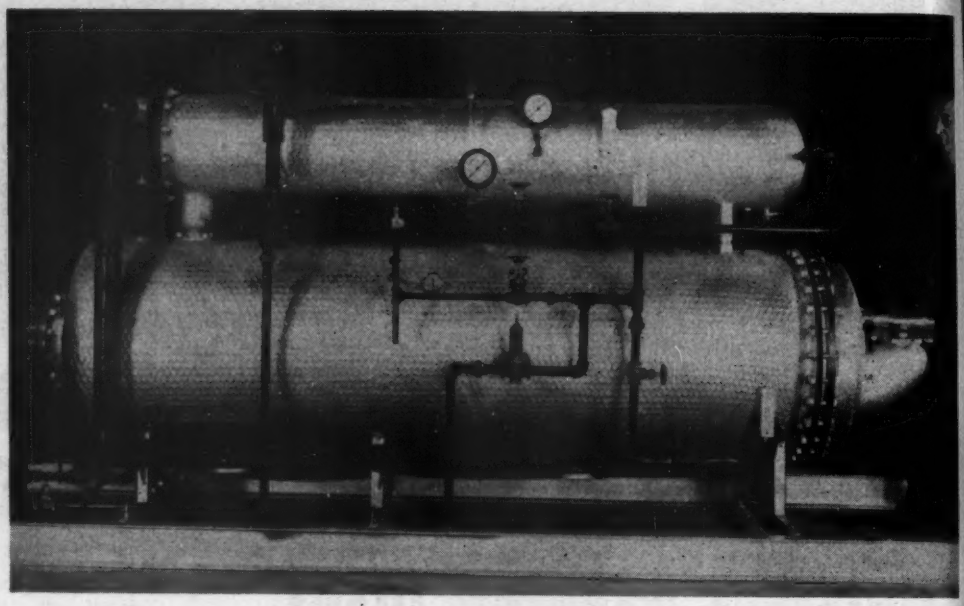
The vaporizers are ideal for furnishing fuel in out-of-the-way locations which are sometimes inaccessible because of being snowed in or impassable side roads. Fuel vaporizers are not built to compete with natural gas where available at reasonable cost, but where natural gas is either expensive or unavailable a fuel vaporizer may make it convenient and economical to use gas engines.

The only volume stripped from the pipe-line oil is that required to operate the engine. This volume amounts to only a small fraction of 1 per cent and its removal from the main stream results in no detectable loss in gravity.

The original ideas for fuel vaporization for gas-engine pumping of



Flow diagram of engine-fuel vaporizer



This fuel vaporizer is one of the four 300-hp. units providing fuel for the Stanolind Pipe Line Co. Sunbeam station 40 miles west of Craig, Colo. The bottom horizontal shell measuring 10 ft. by 30-in. diameter is the "heart" of the vaporizer while the top shell is the gasoline condenser and storage tank. The cold crude feed is through the ½-in. nipple projecting downward to left of center, and just to the right of the nipple is the safety liquid relief valve. The oil-to-oil heat exchanger was mounted on the skids on the far side of the vaporizer

pipe-line oil came from Continental Oil Co. and Phillips Petroleum Co. Development and modifications have been accomplished largely by Black, Sivalls & Bryson, Inc., engineers operating under license from these companies.

The first fuel vaporizer put into service was a 300-hp. unit which was installed at Guernsey, Wyo., in 1940. It generated the gas to operate two 150-hp. engines pumping 13,500 bbl. of oil per day. The amount of crude charged into the vaporizer was only 0.62 per cent (83.8 bbl. per day) of the total volume pumped through the station. It actually converted only 12.4 per cent (10.4 bbl. per day) of the total charge into fuel gas.

The units are rated in accordance with the horsepower of the engine for which they will supply fuel gas. At present the standard fuel vaporizer sizes are 40, 110, 300, and 800 hp.

Five additional units have been built for the Continental: three 300-hp. units, one 150-hp. unit, and one 40-hp. unit. Operation of all fuel vaporizers out has been recently checked and found satisfactory.

The essential parts of a fuel vaporizer are: exhaust gas-feed oil heat exchanger where sufficient heat from the exhaust gas is transferred to a small stream split off from the crude oil pumped to effect vaporization of the light ends; a vapor-liquid separator, a combined gasoline condenser and storage tank (to supply liquid gasoline to start the engine), and a crude-oil feed-bottoms exchanger to conserve heat.

The four 300-hp. vaporizers installed for Stanolind comprise 30-in. diameter by 10-ft.-long horizontal shells mounted on skid bases with 12-in.-diameter by 8-ft.-long horizontal gasoline condenser and storage tanks above (see picture). The crude-oil feed-bottoms heat exchangers were set on the skids at one side of the supports to the vaporizer shells.

The 30-in.-by-10-ft. horizontal shell contains the exhaust gas-feed oil heat exchanger consisting of a removable 1-in. tube bundle, and flash separator (see drawing). The exhaust gas goes through two-pass horizontal tubes from top to bottom and is discharged to the atmosphere above the vaporizer through exhaust risers. The vapor-liquid separator, comprising about one-third of the length of the shell, is opposite the exhaust gas-feed oil exchanger. An overflow dam extending within 3 in. of the top tangent of the shell separates the exchanger from the vapor-liquid separating chamber.

The controlled crude feed is introduced into the bottom of the shell at the front (exhaust) end, rises in the shell around the tubes where it is heated, and overflows the dam into the vapor-liquid separator. A preliminary vapor-separating space is left over the tube bundle. The vapors pass, above the overflowing hot oil, into the separator section where a more complete separation is effected.

Regulation of Oil Level

A float-actuated valve regulates the oil level in the separator. Hot bottoms oil, now stripped of the required fuel vapors, passes through the feed oil-bottoms heat exchanger into a bottoms tank. From here it is pumped back into the pipe line either continuously by a small auxiliary pump or collected and periodically returned by use of the main pumps.

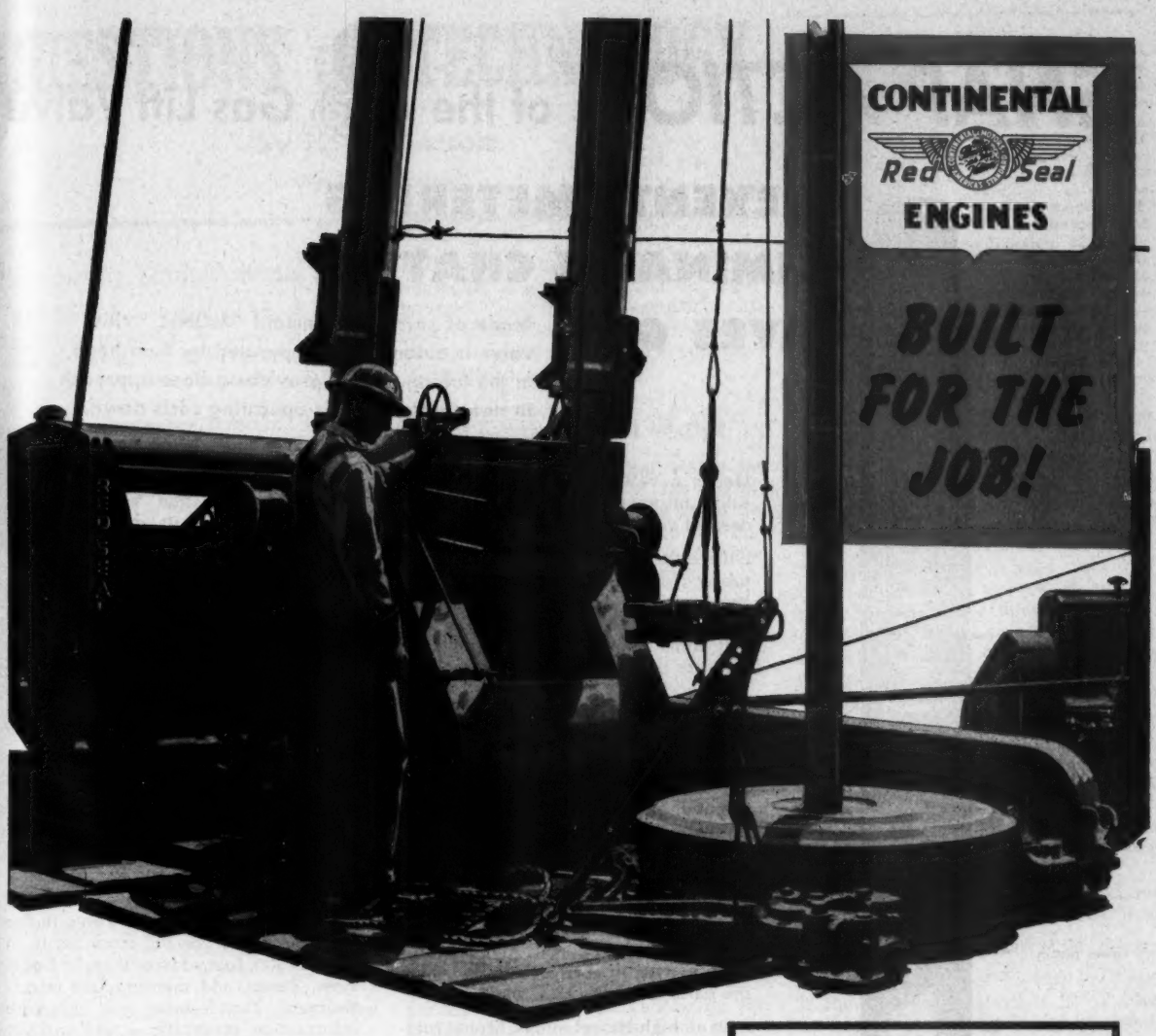
Vapors from the separator, under separator pressure of about 6 to 15 lb., pass up into one end of the gasoline condenser and storage tank. Fuel gas is taken from the top of the other end of the gasoline tank, through a suitable fuel pressure regulator, to the engine.

To insure condensation of a sufficient supply of gasoline, a small condenser is built into the top of the storage tank. Cooling is effected by passing a part of the cold oil feed through the condenser tubes. Any surplus gasoline is automatically refluxed back into the oil separator.

The crude feed is secured from the main oil line and may be taken at any pressure above 50 lb. A liquid pressure regulator holds a set pressure on an adjustable flow-control valve which discharges a small controlled feed stream through the feed oil-bottoms exchanger. Here heat is transferred to the cold-oil feed from the hot discharged bottoms. The feed then passes into the vaporizer shell for further heating and vaporization.

The fuel vaporizer is built for a maximum working pressure of 125 lb. Operating vaporizer pressures are usually below 20 lb. Temperatures in the flash separator vary from 250° to 400° F. depending on the composition of the crude feed. A suitable vapor-relief valve, and, in case a liquid pressure regulator should fail, a suitable relief valve are built into the vaporizer.

Horsepower ratings of fuel vaporizers are nominal, since the amount of fuel that a given vaporizer can deliver depends on the composition of the crude-oil feed. Crudes that boil readily at low temperatures will increase the fuel capacity of a vaporizer, while conversely, higher-boiling crudes (this refers to the initial end of the boiling curve) will reduce fuel capacity. The Rangely crude has an A.P.I. gravity of about 35° and the Stanolind units at Sunbeam require 3 to 3.5 gal. of cold crude feed per minute. Light ends in the crude are subject to losses in handling before reaching the refinery and to this extent fuel vaporizers utilize products which are likely to be lost in transit.



TOUGH JOBS...

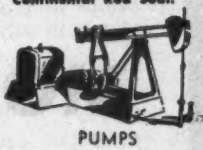
"NATURALS" FOR RED SEAL POWER

The many thousands of Red Seal engines being placed in oil field service confirm the fact that for economy and profit it's best to have the engine that's ***designed and built for the job.***

Red Seal oil field engines, built specially by Continental Motors for this work, are engineered to meet the fuel, power and other operating requirements peculiar to this field. Moreover, special Red Seal super-service depots in Dallas and Los Angeles back up the nationwide network of Red Seal dealers and distributors.

Get the engines that are ***built for the job.*** Let us send you news bulletins on oil field engines and the name of your nearby Continental ***Red Seal*** engine dealer.

Other specialized Continental engines are standard equipment in leading makes of trucks, tractors, earth movers, welders, pumps, spudders, winches. If you farm or fly, you'll find the best engines for these jobs, too, are Continental Red Seal.



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Continental Motors Corporation

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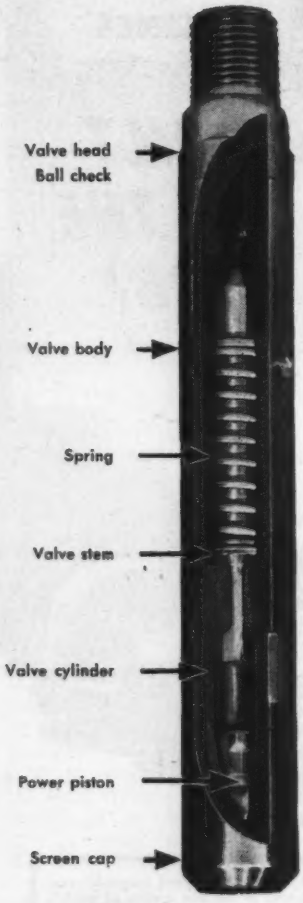
"SNAP ACTION" of the got OLSCO Gas Lift Valve



PREVENTS METERING
ELIMINATES CHATTER
SAVES GAS

Made of corrosion-resistant "MONEL," this valve is automatically operated by fluid head in the tubing. Action provides a close approach to natural flow, holds operating costs down.

Here's a valve designed to give you fully automatic, positive gas lift at desired valve settings.

Differential pressure from casing to tubing closes the *Got-Olsco* "G" Valve against entry of gas into the tubing. The valve opens only when a predetermined head of fluid permits the pressure differential to be overcome.

A compound closing action snaps the valve tightly and quickly shut when the closing differential is reached. Damaging chatter between stem and seat is eliminated. High-pressure gas is trapped, and reduced to low pressure through a by-pass on the stem. This prevents the metering of gas that causes high gas/fluid ratios.

The *Got-Olsco* "G" Valve is of simple construction, as the sectional drawing at the left will tell you. And it's built for life, even in corrosive wells. *All of the parts are made of Monel*.*

Like all high-Nickel alloys, Monel combines strength and toughness with an exceptional degree of resistance to corrosion, abrasion and wear. It's one metal that stands its ground even in the sour gas areas of West Texas and New Mexico.

Monel withstands severe stresses and shocks. It resists high temperatures and the cutting action of gas under pressure. It brings extra life to equipment that is subject to the effects of high sulfur crudes or the destructive attacks of hydrogen sulfide, brine and entrained solids.

Monel brings to the *Got-Olsco* "G" Valve—as it does to so many other types of oil-field equipment—long and reliable operation on jobs that usually eat the heart out of equipment.

Read the brief details of construction and operation of the "G" Valve in the box below. For the *full* story, write to GOT-OLSCO. Just address them at Longview, Texas, and mention this advertisement. That'll bring you complete information promptly — and without obligation.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

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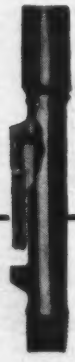
MONEL . . . *Your Partner in Progress*



How the "G" valve is made—and how it works

THE TENSION SPRING of the Got-Olsco "G" Valve is assembled on the valve stem so that it exerts opening force, holding the stem off its seat. (See sectional drawing.) In service, injection gas pressure from the casing overcomes spring tension. The stem moves onto its seat, closing the valve.

When well fluid builds up inside the tubing above a valve to a point where fluid weight plus spring tension is equal to casing pressure, the valve opens. Gas enters the tubing and removes the fluid head.

As the head is removed and tubing pressure drops, the differential across the valve is again established. The valve closes. The action is repeated as often as the well feeds the necessary opening fluid head to the operating valve.

For corrosion resistance, the "G" Valve is made entirely of Monel, the rugged Nickel Alloy that has been successfully used for years in the toughest areas of the mid-continent district. *(Illustrations and operating data courtesy of Got-Olsco, Longview, Texas.)*

QUESTIONS on TECHNOLOGY

by W. L. Nelson

Consulting Engineer

This department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in various phases of plant operation, as well as those connected with the marketing and utilization of petroleum products. Readers are invited to submit their problems to W. L. Nelson, technical editor. Inquiries must be signed, but only the initials will be printed.

Removing Tank Bottoms

We have heard rumors about a jet-type pump which is used to clean tank bottoms and to break the emulsion. Can you direct us to this? F. R. C.

You are probably referring to the so-called vacuum pump of Eastern Tank Service Co. of New York. A sketch of the pump and its auxiliaries is shown in Fig. 1. Steam at 100 psig. is used by the pump. Somewhat similar jets or pumps have been proposed from time to time.

The vacuum pump operates by means of a steam jet. This creates a suction or vacuum which moves the b.s. and w. into the flexible hose line and into a separating tank. On certain emulsified tank bottoms the pump is said to assist in breaking the emulsion. Nevertheless, each emulsion is a new problem and some tank cleaners feel that any device that mixes the emulsion tends to stabilize it.

Tank bottoms are often moved out to a treating tank where they are heated and mixed with a demulsifying agent. If the tank bottoms move directly to the treeating plant without being stored, the treating agent can be added at the transfer pump or perhaps could be introduced at the vacuum pump.

Ordinarily tank bottoms are removed by hand labor. This involves the use of shovels, drag buckets, slips, scrapers, etc. The muck is worked out of an opening on the side of the tank, to a pit where it is heated and pumped to the treating plant or to the refinery fuel system by means of "mud hog" steam pumps. In refineries the muck is sometimes moved from the tank into a truck compartment rather than a pit, and the compartment is hoisted onto a truck and carried to the treating plant.

Use of Earth to Cool Water

Can refrigerant cooling water be cooled by coils buried in the earth? The water is at 95° F. and must be cooled to 70° F. If so, how do you figure the heat transfer, that is, the amount of pipe required? C. F. J.

This hope of getting cooling for nothing is a constant one. Much the same question arose in 1940 (Cooling Gas by Coils in Ground, The Oil and Gas Journal, October 3, 1940, p. 51), in 1941 with respect to buried butane tanks (Vaporization from Buried Butane Tank, February 27, 1941, p. 89), and again in 1945 (Conductivity of Soil, September 15, 1945, p. 110). Of course, the earth can be used for cooling or for heating but the amount of cooling surface required is enormous. Stated in another way, if a sufficiently large investment in cooling surface can be tolerated, the job can be done.

Heat from the ground is relied upon almost universally in vaporizing liquefied petroleum gases from buried storage tanks. About 25 sq. ft. of tank surface is required to vaporize 1 lb. of butane per hour. This amount of butane gas (about 6.5 cu. ft.) is the equivalent in heating value of about 20 cu. ft. of natural gas or 40 cu. ft. of manufactured gas.

Some of the household heating and cooling systems being discussed so much in the press, employ the ground as a source of heat for winter and as a means of cooling during the summer. An enormous amount of heat-transfer surface is required.

The low conductivity of soil is the stumbling block. It ranges from 0.14 to about 1.0 (B.t.u. per sq. ft. per ft. thickness per degree temperature difference) for certain materials such as infusorial earth or stone. This is for dry earth. Wet subsoil has a conductivity of 0.85 to about 2.6. These conductivities indicate heat-transfer rates of only 0.2-0.7 B.t.u. per sq. ft. per degree of temperature difference for dry soils, and up to perhaps 1.3 for wet sandy soils. If the soil is completely wet or if the pipe is set in river-bottom mud, the rates may be as high as 2.5.

To cool 1,000 gal. of water per hour (8,330 lb.) from 95° to 70° F. requires:

$$8{,}330\ (95 - 70) = 208{,}000 \text{ B.t.u. per hr.}$$

At a transfer rate of 0.5 (dry soil) and if the soil temperature is 60° F., the amount of surface required is about:

$$\frac{208{,}000}{0.5 \times 22} = 18{,}900 \text{ sq. ft.}$$

This is the equivalent of the following lengths of standard pipe:

Pipe size	Length
2 inch	30,400 ft.
3 inch	20,600 ft.
4 inch	16,100 ft.

These lengths of pipe would cost many thousands of dollars for each 1,000 gal. of water cooled per hour.

Inasmuch as the poor soil conductivity or transfer rate is the obstacle, attention should be directed primarily at improving the situation. One thing that might be done would be to cover the pipe surface with a soil of good conductivity and to keep the soil wet. This would possibly increase the transfer rate to 2-2.5 and reduce the amount of surface required to only one-fifth of that computed above. The pipe would tend to corrode. Corrosion-resistant material (copper-base alloys) might be used, or perhaps an inhibitor could be developed that would permit the use of plain steel pipe. Finally, plastic or cement-mixture pipe might be useful.

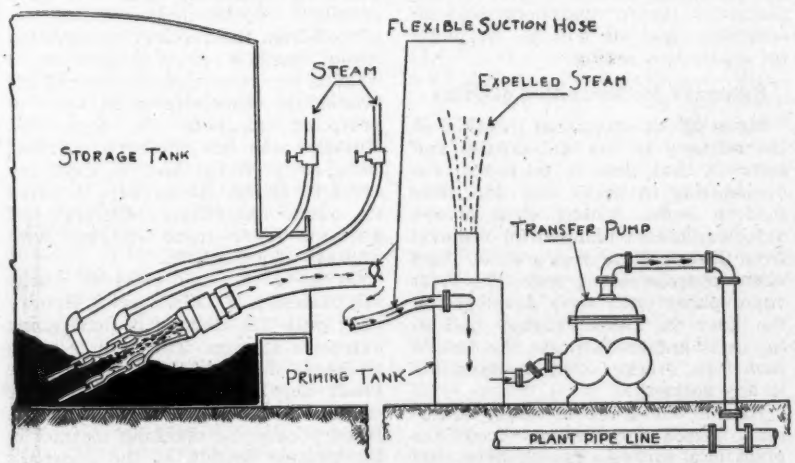
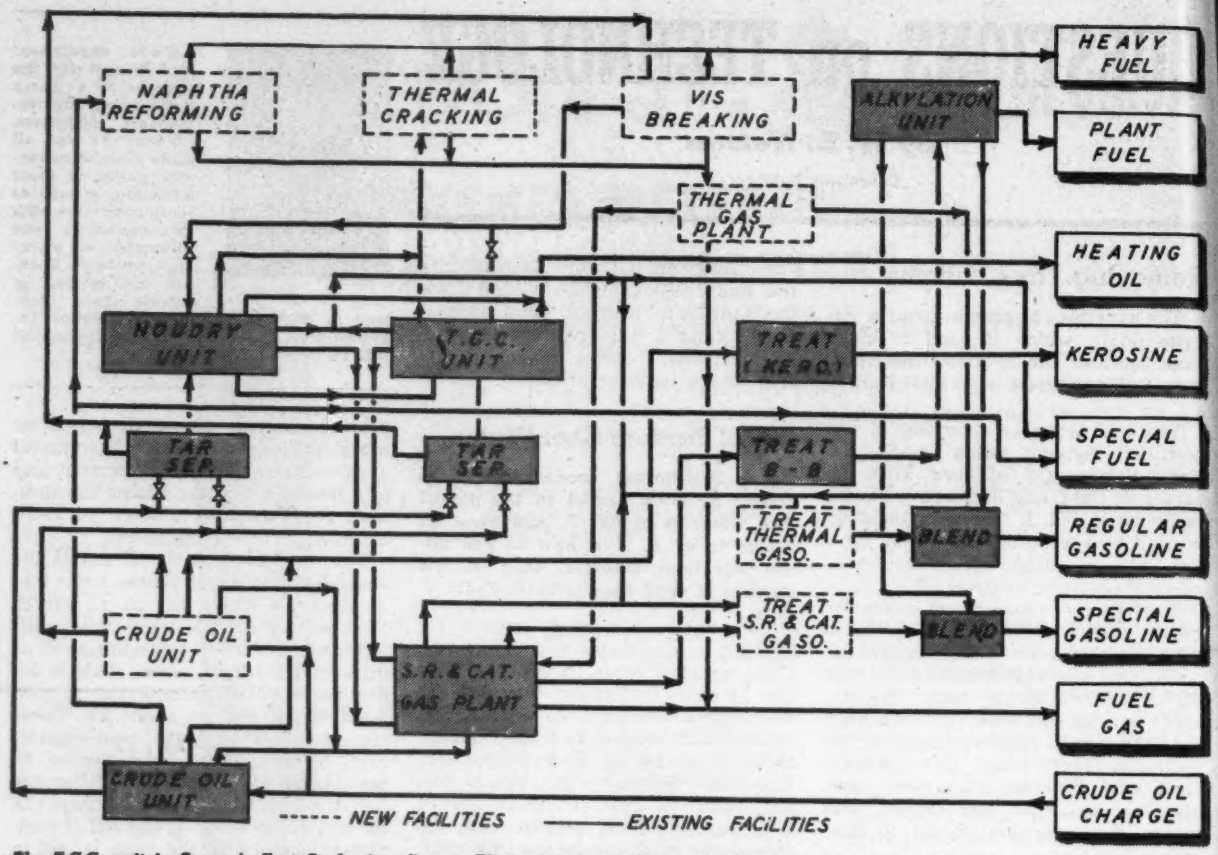


Fig. 1—Vacuum pump and connections for tank cleaning



The T.C.C. unit in Socony's East St. Louis refinery. This catalytic cracking unit along with the renovated Houdry catalytic cracker will process gas-oil fractions to produce motor gasoline

Socony-Vacuum's East St. Louis Refinery Undergoing Extensive Remodeling

by R. B. Tuttle

THE construction project now under way in the East St. Louis, Ill., refinery of Socony-Vacuum Oil Co., Inc., involves extensive changes in the plant's over-all layout. Plans for remodeling the refinery call for a substantial portion of the 45 million dollars authorized for revamping 4 of Socony's 11 plants. Completion of the project will make the East St. Louis plant one of the most flexible of its kind in the country.

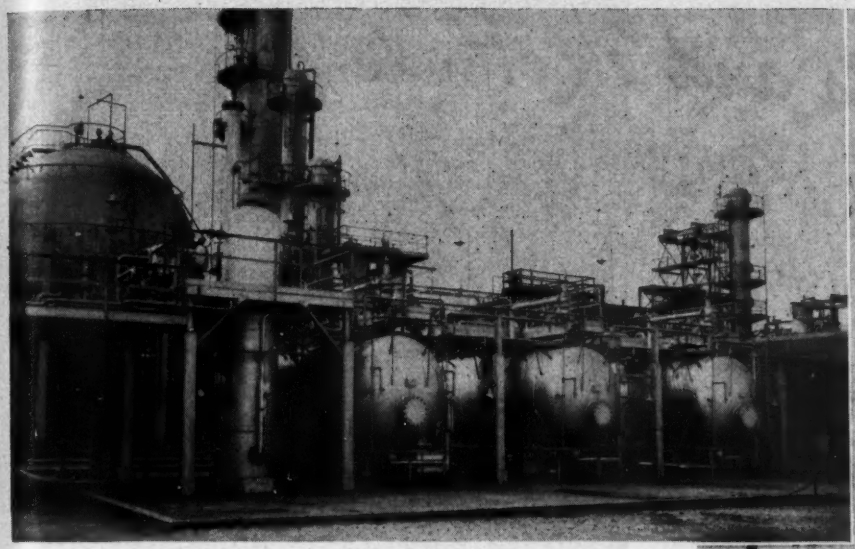
Now rated at 20,000 bbl. per calendar day crude-oil charging capacity and equipped with thermal and two types of catalytic cracking processes plus coking ovens, an HF alkylation unit, and various other processing facilities, the refinery on completion of present plans, is scheduled for a nominal rating of 30,000 bbl. per calendar day on crude-oil input. Substantial stepup in yield volume from the catalytic units is a part of the plans for future operations because additional gas oil will be available for catalytic cracking.

Extensive Modernization of Plant

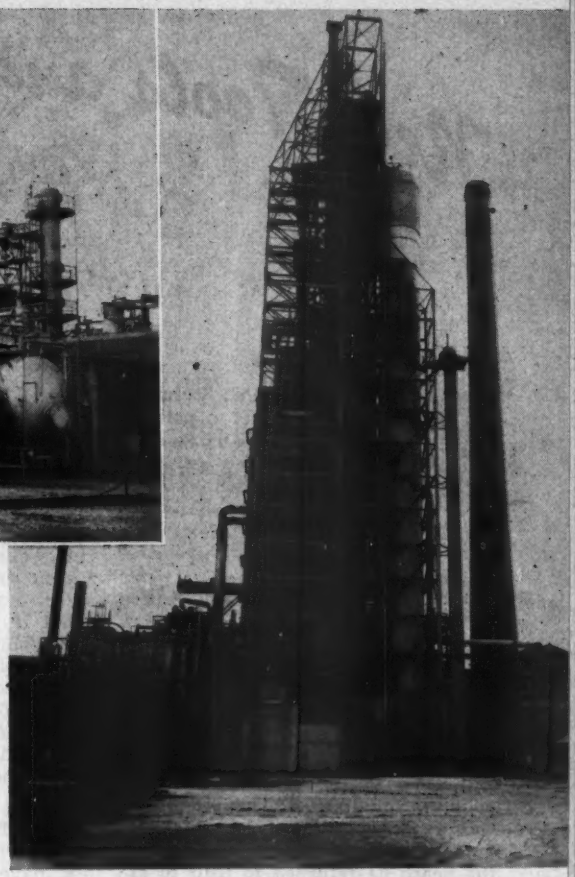
Much of the equipment installed in the refinery in the mid-thirties and prior to that time is scheduled for dismantling to make way for more modern items. Among some of the older equipment planned for removal from the operating area are two Pratt vapor-phase cracking units. The Pratt vapor-phase units were developed at the East St. Louis refinery and so far as is known they are the last of that type cracker still in operation in any refinery.

Also in the group of major equipment slated for removal from the plant is a Knowles coking-oven unit and its auxiliaries. During its several years of operation this unit gave excellent results and is being removed from the refinery's processing layout because its end product, a 99-plus per cent carbon coke, is not producible economically in view of projected markets. In fact, the Knowles unit has not been operated since early World War II days because its charge stocks were diverted to other operations wherein end products were more in line with military requirements.

Of the plant's two catalytic cracking processes, a T.C.C. and a Houdry unit, only the Houdry is undergoing extensive changes. This unit is being changed over to incorporate the latest developments on the process as described in the discussion of the Houdry catalytic cracking method in the process section of the Journal's Refining Number of April 1, 1948.



This equipment, a B-B treater, is to be incorporated into the normal refinery flow arrangement. The sphere in the background, left, is located adjacent to an HF alkylation unit which will also be tied into future operations at East St. Louis



The T.C.C. unit in Socony's East St. Louis refinery. Much of the equipment in the background is to be removed in the modernization of the refinery. Now under way, the modernization project includes plans for extensive changes to most of the plant's older installations

Revisions planned for the T.C.C. unit are only minor and involve principally its integration with over-all refinery flow for flexibility specifications.

The HF alkylation unit, idle since the war's end, is to be rehabilitated and placed in regular operation in the new flow arrangement for the East St. Louis refinery. The products from the alkylation operations will be employed for the most part in motor-fuel blending.

Two of the refinery's three existing light-oil treaters are to be abandoned. These units will be replaced with two new solutizer treating units. The gasoline and treating solution will be contacted in the liquid phase in tower equipped with Koch Kascade trays. Currently kerosine treating is by batch methods but under the new arrangement this operation will be on a continuous basis. An existing gasoline treater is to be converted to continuous kerosine-treating service.

New processing facilities to be installed in the refinery consist of:

Naphtha reforming, thermal cracking, visbreaking, thermal gas processing, gasoline treating, and crude topping (expanded).

The existing crude unit has a nominal rating of 15,000 bbl. per calendar day but has been operated approximately 150 per cent of rating for some time. Plans for operation of the new crude unit, which is also designed for a nominal rating of 15,000 bbl. per calendar day, call for it to take half of the refinery's operating load. Overhead and side-cut streams from two crude units will be handled through common lines whereas bottoms from the two units will be run separately to the tar separators at each catalytic unit. Lines carrying the two streams will be connected to both tar separators. The existing topping installation was redesigned for more efficient fractionation and to produce a 300-400 naphtha. This cut, which is to be obtained from both units, is to be processed in the new naphtha-reforming unit.

Gas-oil cuts from both Houdry and T.C.C. operations will make up feed stock for charging the new thermal cracker. Feed for the visbreaker will be obtained from the bottoms of the two tar separators. As far as feasible operationalwise all thermal operations will be interconnected for maximum flexibility.

In addition to revamping and rehabilitation of existing units and erection of the foregoing new units the refinery program includes rearrangement of some equipment in the various operating areas. The rearrangement will allow different zones in the plant to be completely isolated in event of fire.

Space for additional storage has been obtained adjacent to the refinery. The storage scheduled for erection in this new area is nearly 1,000 ft. from the refinery proper and will be connected to overhead lines from and to the plant since several railroad tracks and a highway located between the two sites must be crossed in that manner. Contract for the project has been assigned to Bechtel Corp., that company's first domestic oil-refinery job east of the Mississippi River.

Extent of the project as reflected in yield increase is indicated in the following tabulation:

APPROXIMATE YIELDS, BARRELS PER CALENDAR DAY BASIS

Product—	Before present program	After program completed
Gasoline	9,000-11,000	14,000-18,000
Light burning oils	3,000	2,500-4,500
Diesel fuels, Nos. 2, 3, and 6 fuel oils	5,500-7,500*	8,000-11,000*

*Including gas reduced to f.o.e. basis and losses.

Design of Socony's new layout at East St. Louis is focused on efficiency in producing a wide variety of specification materials as established by demand markets. In the event of a national emergency the entire refinery, under its revamped status, can be converted on short notice to the production of aviation and other type special fuels. The accompanying flow diagram illustrates the flow arrangement of the refinery after the project, now under way, has been completed.

New Tools and Methods for GULF COAST WORKOVER JOBS

J. W. Quinn is district petroleum engineer, Houston district, for Gulf Oil Corp. He is a native of Tyler, Tex., and a graduate of Notre Dame University where he received a B.S. degree in electrical engineering in 1934. Quinn joined Gulf upon graduation from college and went to work in the East Texas field as a roughneck. He was made district engineer at Longview in 1937 and came to Houston as petroleum engineer in 1939. During the war, Quinn was an officer in the Army Signal Corps doing radar work. With the peace he returned to Gulf to assume his present position.

by J. W. Quinn

THE use of salt water as a drilling fluid has become increasingly more important in workover operations in the Gulf Coast. The particular type of job, of course, always influences the selection of a drilling fluid as we have yet to develop a universal drilling mud. Probably the most important single advantage of salt water over fresh-water mud is the decrease afforded in the swelling of bentonitic and other clay particles. This property of salt water is almost as important an advantage in strictly shale sections as it is in sand sections contaminated by clay particles.

As a direct sequence of this advantage, reference may be made to excellent initial productions obtained from reworking several wells wherein salt water was used. Three wells in Hull and Sour Lake fields are good examples. Good recompletions of the Hull wells were not solely attributable to the use of salt water as it is a fact that these wells were reperforated in good-looking sand sections which should have given good results with a suitable fresh-water-base mud. Nevertheless, other past recompletions in two or three neighboring wells, wherein fresh-water-base muds were used, did not have as good initial productions as the two referred-to wells.

Several other workover jobs have been performed with salt water, but few have been such that statistical benefits can be set forth. In the light of laboratory experiments, however, there can be no doubt but that shaly and silty sands retain their natural permeabilities better when salt water is used than when fresh-water or fresh-water-base muds are used.

Another distinct advantage of using salt water in recompletion work is in the case where screens are necessary. Reference here is to actual costs of completing such a workover. The costs of several jobs have been compared and it has been found that the salt-water recompletions average about 20 per cent cheaper. This is accounted for by the fact that screen plugging is not as commonplace as when fresh-water muds are used. The hazard of mud-caked screens is removed by the use of salt water, and in turn, fewer screens have been found up the hole after the salt-water jobs. These up-the-hole screens were frequent in the past as a result of pressure differentials acting on mud-caked screens. As yet there has been no evidence that any of our screens have cut out after employing salt water in remedial work. This used to be quite common where mud-caked and plugged screens resulted from conventional mud recompletions. We have cases in our files where screens have cut out in a matter of 2 or 3 days after a recompletion.

Disadvantages of Salt Water

Of course, there are disadvantages attendant to the use of salt water as a drilling fluid and it is of primary importance that its use be restricted to remedial work in which these factors are of little or no consequence. In cases where a little more hole is to be made or where sand is being washed out, it is more difficult completely to clean the hole up. The low viscosity and colloidal properties of salt water are responsible for this. The lack of wall-building qualities is a distinct disadvantage especially in open-hole jobs. In these cases, walls will invariably slough off, and it is difficult to carry on any work in such an open hole. Fair wall-building qualities can be developed with salt water by the use of starch. This also furnishes a low-water-loss fluid, but the cost of treating salt water with starch is rather expensive where a

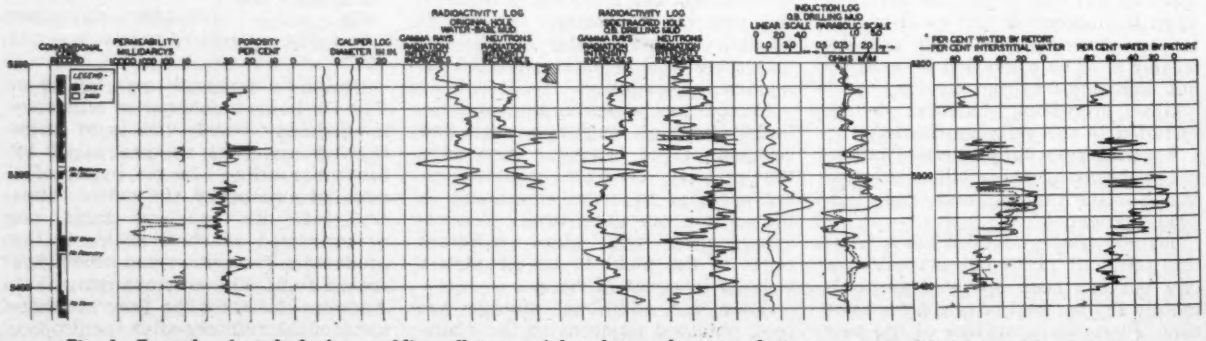
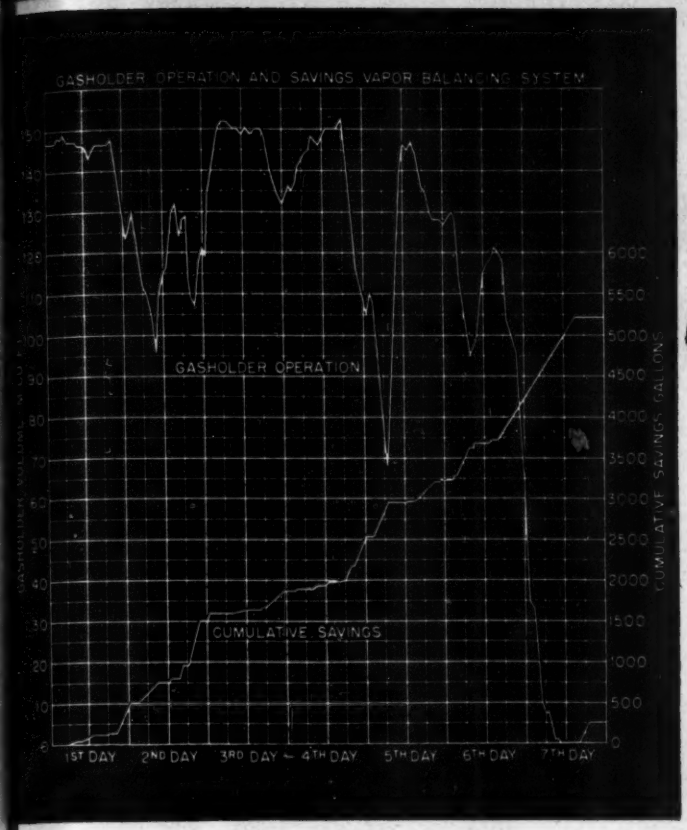

CONVENTIONAL CORE RECORD
PERMEABILITY MILLIDARCYS
POROSITY PER CENT
CALIPER LOG DIAMETER IN IN.
RADIOACTIVITY LOG ORIGINAL HOLE WATER-BASE MUD
RADIOACTIVITY LOG SIDETRACKED HOLE OIL DRILLING MUD
INDUCTION LOG OIL DRILLING MUD
LINEAR SCALE PARABOLIC SCALE
OHMS M/M
PER CENT WATER BY RETORT
PER CENT INTERSTITIAL WATER
PER CENT WATER BY RETORT

Fig. 1—Example of method of assembling all types of log data and core analysis on one record for comparison and study



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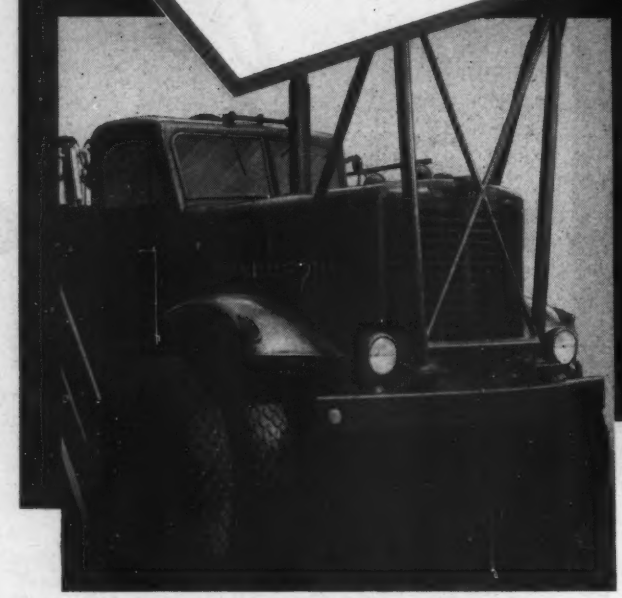
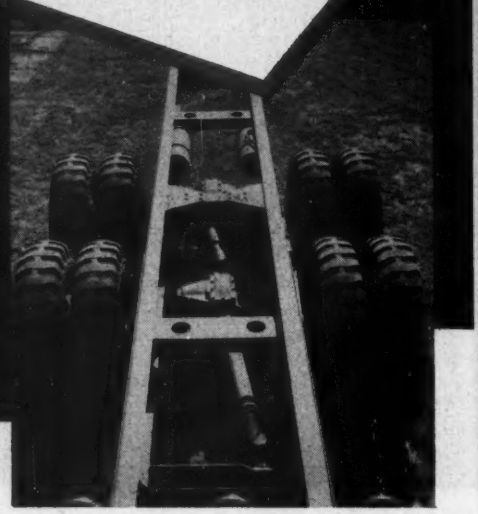
BIG ENOUGH *and* STRONG ENOUGH





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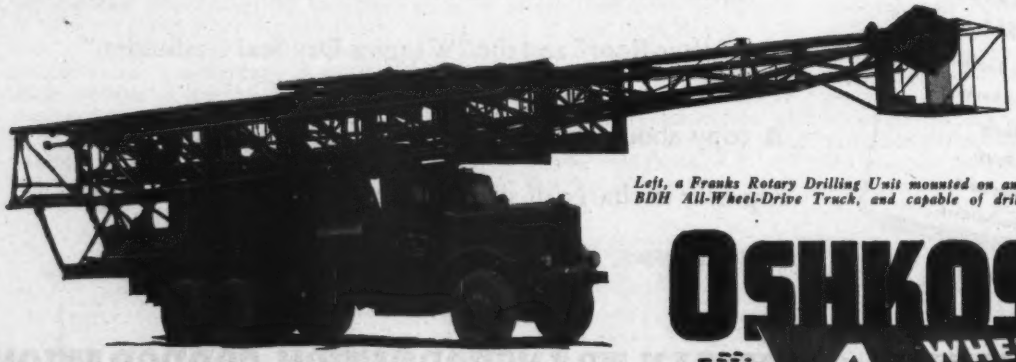

Left, a Franks Rotary Drilling Unit mounted on an Oshkosh Model W-1600-BDH All-Wheel-Drive Truck, and capable of drilling 4,000 to 8,000 feet.

Write for Literature

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OSHKOSH, WISCONSIN

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considerable volume of drilling fluid is being used.

Water loss to formations is usually high using salt water and this is a disadvantage in that expensive rig-shutdown time is required at times when a plug back is trying to be evaluated as soon as possible. Several days are necessary sometimes to produce the well long enough to be assured that all the lost salt water has been recovered. A possible remedy for this would be the use of a little fluorescein in the salt water. Fluorescein is a cheap compound and very little is necessary to impart a greenish cast to the water. It affords a simple method for determining visually when all lost salt water has been produced.

Oil-Base Muds Important

What we believe will become an increasingly important innovation in the recompletion of wells in semi-depleted reservoirs is the use of oil-base drilling mud. At the moment we must class the investigation of the use of oil-base drilling mud as experimental. We have made two recompletion attempts with oil-base mud. We feel certain that some measure of success was attained in both of these wells. The first was completed in a 1,400-ft. sand which had failed to produce anything in several other normally attempted completions in the immediate area.

Core-analysis data indicated that some reduction in permeability could be expected as a result of drilling this section with water-base mud. It was completed with oil-base mud and is now flowing at the rate of 1,000 bbl. of fresh-to-brackish water a day through 2-in. tubing. This job is considered successful in two lights: first, it was completed as a flowing well, and secondly, it will be an aid in reevaluating our reserve picture as these shallow sands had given indications of being oil sands and some reserve has been allotted to them.

It is believed that some additional measure of success was attained in completing this well by the use of a 4-in. o.d. screen set in a 4½-in. o.d. hole. Several operators in Sour Lake and Saratoga fields have recently completed some wells drilled with conventional drilling mud in which they employed screens whose outside diameters very closely approached the hole diameter. Invariably these wells were completed for higher initial productions than wells in which several inches separated the hole and the screens. No trouble was encountered in setting this screen and the possible benefits are being studied.

The second well was sidetracked and recompleted 57 ft. below its old total depth where it had died due to excessive water production. It is now producing from a 2-ft. section, 5,381-83 ft., of low permeability which appears to be a laminated lens flanked above and below by more permeable produced water sands. Core analysis indicated this lower zone to have been produced and to contain only residual oil in the vicinity of this well. The analysis also indicated that we could probably have never established flow from the 2-ft. section had it been drilled with a water-base mud.

This producing zone will probably not be too prolific, but it is most certainly producing oil which would never have been recovered under ordinary conditions. A considerable oil column remains to be tested in this well and undoubtedly other intervals will exist which would not have been adequately drained by an ordinary recompletion. The accompanying drawing shows a correlation of all the logging information obtained in sidetracking this well as compared to a raidoactivity log of the original hole.

Radioactivity Logs Used Extensively

Among the tools and instruments being employed in present recompletion work, the gamma ray-neutron log is probably the most important single device in use. The chief use of radioactivity logs is to locate oil sands which are cased off, whether intentionally, or because their existence was not suspected when a well was drilled. This is the only way we have to detect oil sands behind the casing in wells drilled prior to the innovation of electric logging. An important feature in locating such sands is that their position relative to casing collars can be determined; thus a perforating gun with feelers can assure us of a completion as desired.

This location of a zone with respect to a definite marker practically eliminates the errors due to differences in lines and measuring devices. It has also practically eliminated the extreme care which used to be necessary in correcting for two different derrick-floor elevations. Another very important result of gamma ray-neutron survey is that the casing point with respect to the producing horizon can be definitely established. The writer can safely state that at least one case where the casing has been set below the top of the producing zone has been found in almost every oil field in which we operate.

An additional feature of gamma ray-neutron surveys which we have not exploited as yet is the fact that what are believed to be oil sands have been located in wells where electric logs had failed to indicate any possibility. Several suspected oil zones have actually been found in this manner in Old Ocean field, and we have several wells which have good indications of similarly existing sands which will be tested when present horizons have been exhausted. This situation results from washed-out sections which affect electric logs much more than gamma ray logs. These washed-out sections will affect the neutron curve, however, and it is this effect which makes it easier to evaluate such a sand.

Radioactivity logs are not a cureall though. They have their limitations and questionable features. In the first place, they are difficult to interpret and correlate. Rather flexible rules exist for their interpretation, but the writer is about convinced that experince is the crowning asset in making decisions based on gamma ray-neutron surveys. The neutron curve does not adequately indicate the type of fluid in a reservoir, and as mentioned before it is affected by variations in hole diameter. There are certain silty sand areas such as Fig Ridge and Anahuac which are naturally radioactive. Areas such as these distort radioactivity logs and limit their value.

New Logging Method Under Test

I should like to mention electric induction logs here, and class them as experimental equipment being investigated at this time. This type of logging appears to have considerable merit in holes which have been drilled or reworked with oil-base drilling mud. The induction curve supplants the resistivity curve of the ordinary electric log and appears to be capable of reflecting true formation resistivity irrespective of nominal oil-base drilling-mud invasion. We cannot completely evaluate induction logs as yet, but the two wells in which we have employed them indicate good correlation and interpretation with known data.

Not the least important procedure in recompleting wells in semidepleted oil reservoirs is coring and the interpretation of core data. It is important to consider the merits of core information when an opportunity affords itself such as sidetrack jobs and new wells. Such wells as these afford us an excellent opportunity to evaluate present conditions of a semidepleted reservoir and to better predict its future performance. In many cases, coring done during certain recompletion work affords the only opportunity to know just what reserves we have in some of our fields.

Coring and logging do not necessarily supplant one another, but they should be thought of as being correlative. Today we are depending more and more on the laboratory to furnish us with every bit of information it can determine from cores. Shale and bentonitic particle content, bedding planes, cementation, and sand-grain shapes are among the factors we like to know about reservoir rocks. These characteristics are no longer academic properties, but have a direct bearing on reservoir performances and recompletion techniques. They are as important to a production man as are pipe-wall thicknesses or packer setting or pump spacing.

Sand Blasting Useful In Cleaning Variety Of Metal Surfaces

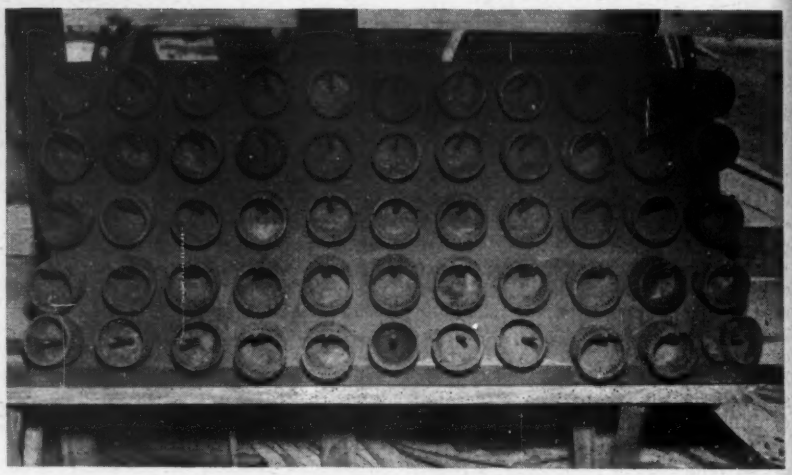

Fig. 1—(Above) Bubble-caps on rack, being sand blasted

Fig. 2—(Right) Close-up of larger rack, which can hold 55 4-in. caps

by Forrest Gober*

SAND blasting has been employed in the Baytown refinery of Humble Oil & Refining Co. since about 1930 for the cleaning of a wide variety of metal surfaces. Prior to 1940 the most common examples were reclaimed fittings, bubble caps, and large surfaces such as tank plate.

The first application of sand blasting to cleaning of exchanger bundles externally was made in 1941. Upon further development it was found that this procedure was still more satisfactory for the cleaning of exchanger tubes internally. This method largely replaced various makeshift combinations such as drilling, steam cleaning, and hose washing, and is now widely used except for instances in which solvent cleaning has been found cheaper or where bundle design makes this method impractical.

Sand blasting offers the advantages of being fast and thorough in comparison with other methods and of leaving a surface ideal for painting, guniting, or metallizing. This method is relatively inexpensive where the volume of work will justify the initial expense and where compressed air is available at a marginal cost. It has the disadvantage of requiring bulky equipment which must be used in a relatively isolated location unless measures are taken to confine the dust or make the area gas free.

Facilities and Equipment

Facilities for sand blasting now in use consist of two "shops" each equipped with several sand-blast machines and storage bins for about 10 yd. of sand. One is an open shed about 30 by 60 ft. in size which provides protection for five machines and a sand bin, and is large enough to accommodate the majority of the smaller work handled. The second shop is equipped with a lean-to to protect four machines, but here all work is done in the open. At present there are 10 sand-blast machines in use.

A recent addition to equipment of this type is a wet-blast machine which has some advantages over conventional machines. By introducing about 1 gal. of water per 20 lb. of sand the machine reduces dust to a negligible amount and reduces sparking to some extent. An inhibitor added to the water reduces oxidation which would normally occur on the blasted metal surface, and makes it possible to delay painting by about 24 hours.

Experience gained thus far indicates that better performance from this machine is obtained with a somewhat finer sand than required by the conventional machine which results in a slower cutting action. The wet-blast machine is not intended as an alternate to the older equipment, but primarily to be used in the field in preparation for painting where the conventional machines are not applicable.

Each machine is equipped with about 100 ft. of 1¼ by ¾-in. four-ply hose having built-in static ground wires. Nozzles used for the majority of sand-blast work are made of tungsten carbide in the ⅜-in. size. Protective equipment used by the nozzle operator consists of a mask, to which charcoal filtered air is supplied, a rubberized hood, and rubber gloves.

Abrasives

The abrasive used for all sand blasting is ungraded river-bank sand. A typical sieve analysis of the sand is as follows:

Sieve No.	Per cent passing
4	99
16	74
50	14
100	2

Being shipped in open cars the sand contains widely varying amounts of moisture. All sand is dried in the interest of uniformity and to retard rusting of the cleaned metal.

Typical of the smaller equipment of which a large amount is cleaned

*Maintenance engineering and inspection department, Humble Oil & Refining Co., Baytown, Tex.

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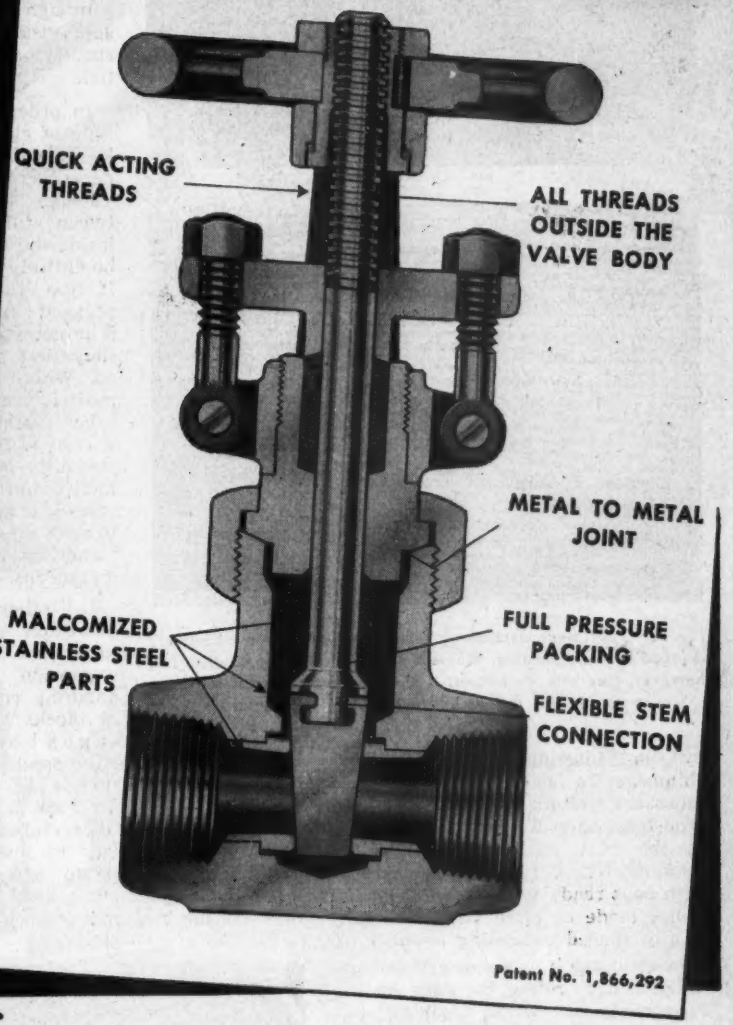

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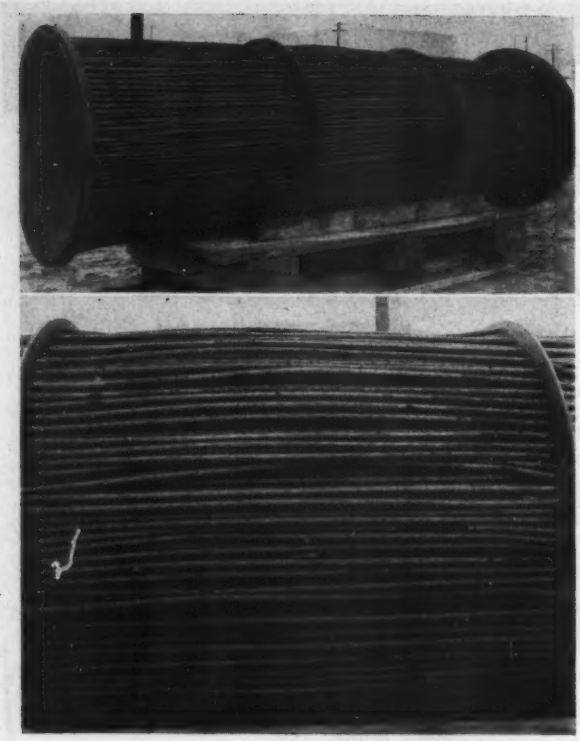


Fig. 3—(Top) Heat exchanger tube bundles can be effectively cleaned by sand blasting. Where the tubes have become distorted, however, (see Fig. 4—bottom) it is necessary to insert flat bars in the lanes, to spread and obtain full exposure

by sand blasting are bellcaps and chimneys. To facilitate this work two racks are provided at the shop area sand-blast shop for holding the work in the best position for effective cleaning. These racks, shown loaded with caps ready to be cleaned in Fig. 1, are made of plate with rods uniformly spaced extending about 4 in.

In cleaning it is necessary for the nozzlemen to rotate the caps on the supporting rod while cleaning, but most of the force of the jet is resisted by the supporting rods. With this arrangement, the nozzlemen is not required actually to handle the cap which would be somewhat awkward with the heavy rubber gauntlets worn.

Prior to sand blasting, coke and carbonaceous material is burned from the caps in an oven. As shown in Fig. 1 the caps are relatively free of heavy deposits. A rack of caps as shown in Figs. 1 and 2 containing twenty-eight 6-in. or fifty-five 4-in. caps requires 15 to 20 minutes for cleaning. Chimneys are cleaned in a similar manner on the same rack at approximately the same rate.

Sand-Blast Cleaning of Exchanger Bundles

One of the most successful applications of sand blasting is the internal and external cleaning of heat-exchanger tubes. No additional sand-blasting equipment is required for cleaning bundles and the routine labor personnel are qualified with little additional training, although adequate supervision and inspection are essential.

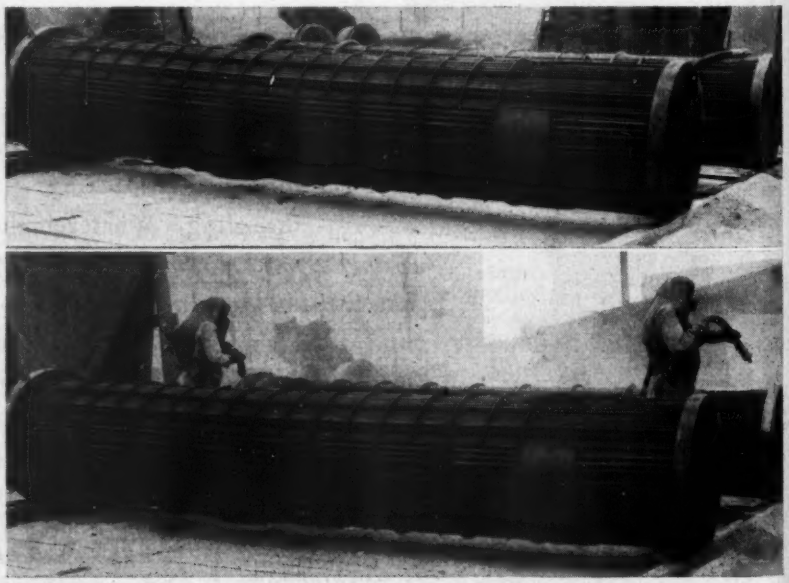
In order for this type of cleaning to be effective, it is necessary that the passage, both between tubes and inside the tube, not be entirely blocked. If the tubes are plugged internally, it is necessary that they first be drilled. Where the deposit is around the tubes, prewashing with water or steam is often effective and in some cases it is necessary to open up cleaning "lanes" by mechanical means.

In other cases distortion of the tubes by thermal expansion or in handling completely blocks the passages between tubes making effective sand blasting impossible. An example of such a bundle is shown in Figs. 3 and 4. In order to clean these tubes externally, it is necessary to insert flat bars in the lanes to spread the tubes. Such a procedure is tedious and time consuming, and even with the greatest care, considerable amounts of sand and dislodged scale may be retained within the bundle.

Other bundles which can be more successfully cleaned by sand blasting are shown on Figs. 5 and 6. Each bundle consists of seven hundred sixty-four ¾-in. by 14 ga. by 16-ft. admiralty tubes on 1-in. square pitch. The exchangers are located about 3 and 6 ft. respectively above grade in an area readily accessible for pulling the bundle. At a recent turnaround these bundles were removed and hauled by carrier to the shop area sand-blast shed for cleaning. The pressure drop in the tubes was lowered from 14 to 2 psi., and the heat-transfer coefficient was raised from 55 B.t.u. per hour per foot^2 to 75.1 B.t.u. per hour per foot^2 compared to the design coefficient of 66.7.

From the above it may be concluded that sand-blast cleaning of exchanger bundles has its greatest usefulness when applied to the inside diameter of tubes which are not completely plugged but which require more stringent methods than water washing or "punching." Effective external sand-blasting cleaning is largely confined to square-pitch bundles having lanes at least ¼ in. in width.

On bundles having closely spaced tubes on triangular pitch the blast cannot be expected to penetrate more than six to eight rows of which the last 50 per cent are no more than partially cleaned. Beyond this depth the condition of the tubes is virtually unchanged, and unless care is exercised, sand may combine with the deposits already present to such an extent that the interior of the bundle is more completely fouled than before cleaning was begun.



Figs. 5 and 6—These big tube bundles (764 tubes 3/4 in. by 16 ft.) were transported via mobile carrier to the sand-blast work area shown, and cleaned. Result: heat-transfer coefficient raised 50 per cent

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Is Your Well Still Drilling GRANITE WASH Or Have You Reached SOLID GRANITE?

by Charles J. Deegan

SOMETIMES it is hard to tell whether a well (particularly a wildcat) is drilling in granite wash, or is making hole through solid granite. If it is in solid granite it should be abandoned at once. If it is in granite wash it may still have excellent prospects. This is particularly true of certain areas in southwestern Oklahoma and the Texas Panhandle, northeast New Mexico, and portions of Colorado. (See Fig. 1.)

There are times when drilling contractors, geologists, operators, and royalty owners have heated arguments about whether a certain well has reached solid granite, or is still in the granite wash. A sizable amount of money may be involved. What shall be done about dry-hole, or bottom-hole payments? Shall a sizable block of leases be dropped, or should another rental payment be made to hold them? Has the drilling contractor completed his obligation? Partners can disagree on the answers. How can either one prove he is right?

The drill cuttings may look exactly

Fig. 2—(Right) An illustration of part of the research work on the magnetic properties of granite. Measurements were made on pieces taken directly from unweathered solid granite rock in the Wichita Mountains of Oklahoma. These measurements were compared with those made on pieces of granite wash that had been eroded or broken off the same granite and were lying on the mountain side

Fig. 3—(Below, center) Artist's idea of "magnetic susceptibility." In natural state, magnetic particles in granite wash act like bar magnets in diagram on left. Many of them line up so that they form a lot of closed magnetic circuits. After being put in a magnetic field and pulled around by the more powerful force of that field, they line up and form the equivalent of one large bar magnet

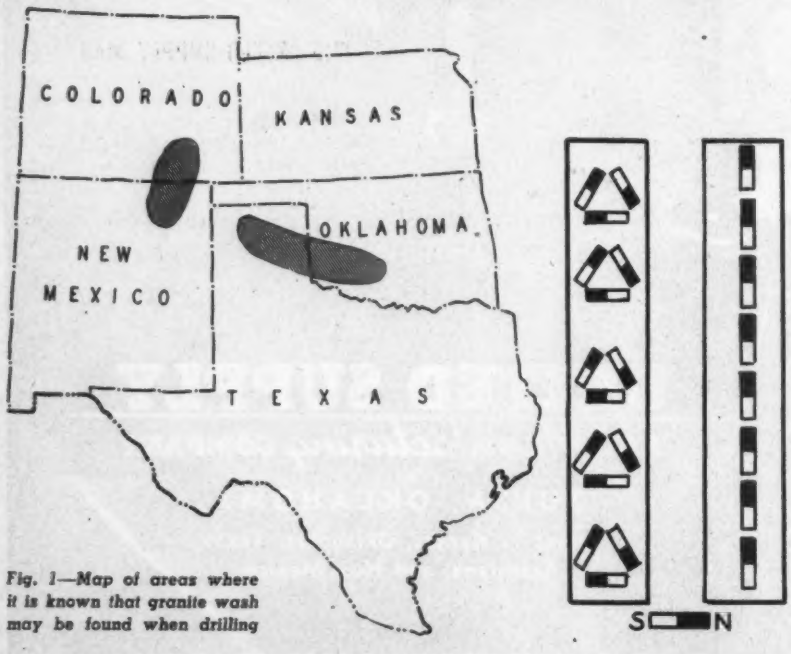
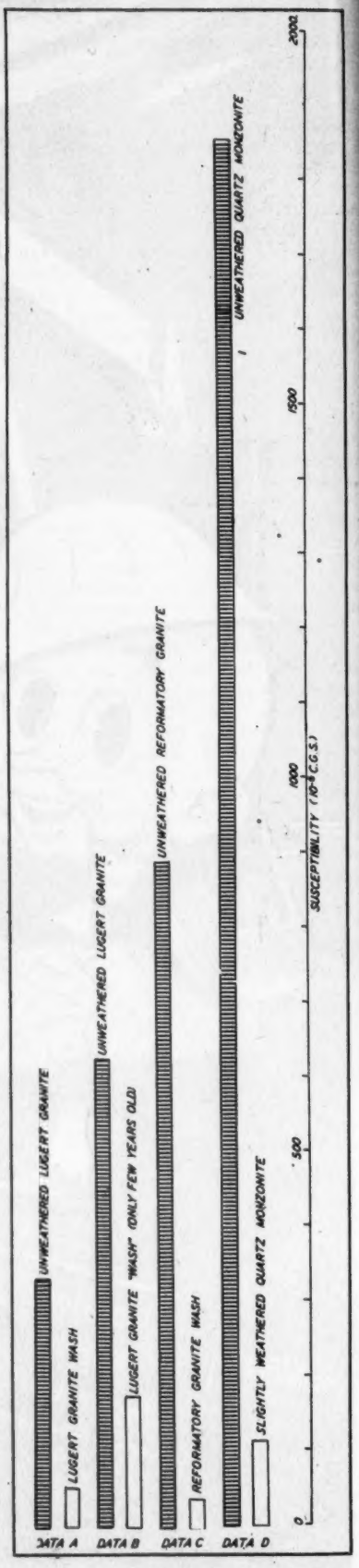


Fig. 1—Map of areas where it is known that granite wash may be found when drilling



Mission San Francisco de la Espada. Transferred to San Antonio in 1731. Rebuilt in 1845, with original facade. Painting by Girard Goodenow.

Historic Missions of the Old Southwest

HISTORICALLY this mission was the first of the Spanish missions in Texas, and bore the original name of San Francisco de los Tejas (pronounced Tehas), or the mission of Saint Francis of the Texans.

In 1685 LaSalle had built a fort at Matagorda Bay on the Texas coast. Mexico sent three expeditions to exterminate it. The third, under Alonzo de Leon, reached it, but Indians had already killed the garrison. The next year de Leon returned to Texas accompanied by Fr. Damien Manzanet and erected Texas' first mission, probably 45 miles southwest of Nacogdoches. Later a second mission was founded a few miles to the north. In 1693 both were abandoned, the bells being first buried.

In 1715 Fr. Antonio Margil, who had founded four missions in the Texas coastal area, reoccupied these original Texas missions and founded six more in that vicinity. As a result of Indian hostilities these missions were later removed to San Antonio, and the name of San Francisco de los Tejas was changed to San Francisco de la Espada.

In ability and achievement among American missionaries, Father Antonio Margil ranks second only to Father Junipero Serra of California. He founded the Franciscan college of Guadalupe at Zacatecas, Mexico, and was two terms Padre Presidente of Texas missions.

Mission Manufacturing Company acknowledges with thanks the many expressions received from oil men on this series, which seeks to emphasize the courage and sacrifice upon which a great nation has been built. Please turn the page for a message on Mission products.

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alike. Drilling time may not be a good yardstick. Some solid granites drill up easier and faster than some hard limes and cherts. A bed of granite wash can include some pretty big boulders of granite that will naturally drill slower than the rest of the wash if the bit happens to hit one. Anyone can see examples of these boulders in the piles of rubble at the foot of slopes in granite mountain country. When the drilling time slows up in a granite wash section, you wonder whether the bit is working on a large boulder, or whether you've finally reached solid granite.

Sometimes the question can be answered definitely from the results of a microscopic examination of the drill cuttings by a geologist or a petrographer. There are other times when you simply can't get a definite answer, even by this method. Wrong guesses have been made about some wells, regardless of what tests were used. Some wells have drilled through several hundred feet of solid granite, while others have been abandoned while still in granite wash.

This sort of thing need not happen any more. Now there is a new method that gives a definite answer. You don't have to wonder any longer; you can get the facts.

After more than 3 years of research, Garvin L. Taylor, geological department, and Duane H. Reno, research department, of Stanolind Oil & Gas Co., devised a test which works. The test is based on a sound scientific principle (magnetic properties), and has been checked carefully. Contractors will be glad to hear that the test requires no changes in standard drilling practices on wildcat wells, and that there are no gadgets to be run down the hole.

The check is based on research work which proves that there is a substantial difference between the magnetic properties of granite wash and those of solid granite (unweathered) that is still firmly attached to the core of the earth. (See Fig. 2.)

The test consists of magnetic property measurements made on ordinary

Fig. 4—Well at left went from granite wash into unweathered solid granite a little below 1,600 ft. Well at right was still in granite wash at about 4,000 ft., and went into unweathered solid granite shortly thereafter. This well drilled over 2,000 ft. of solid granite

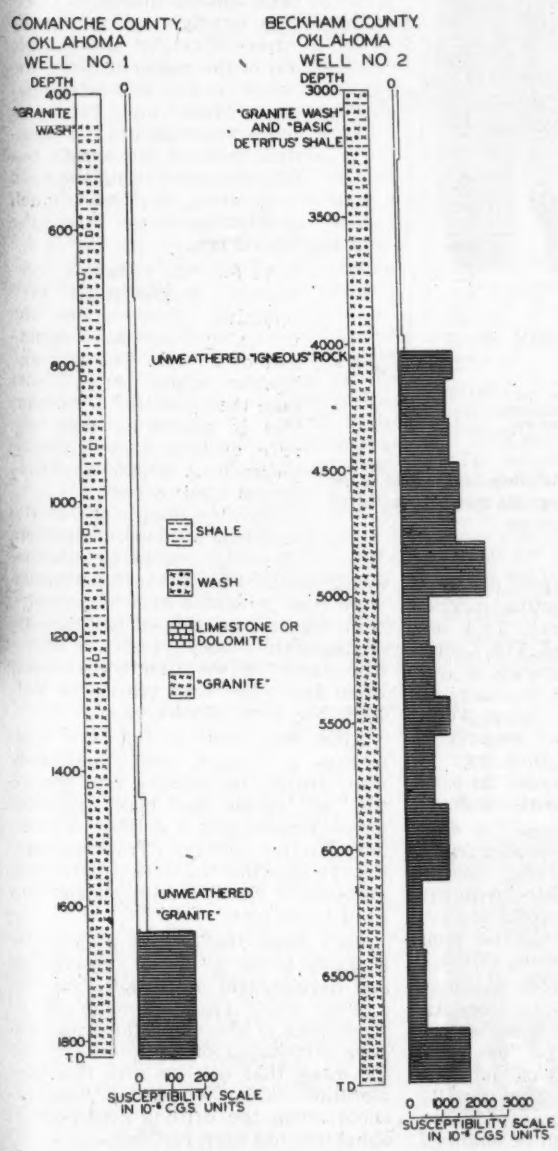
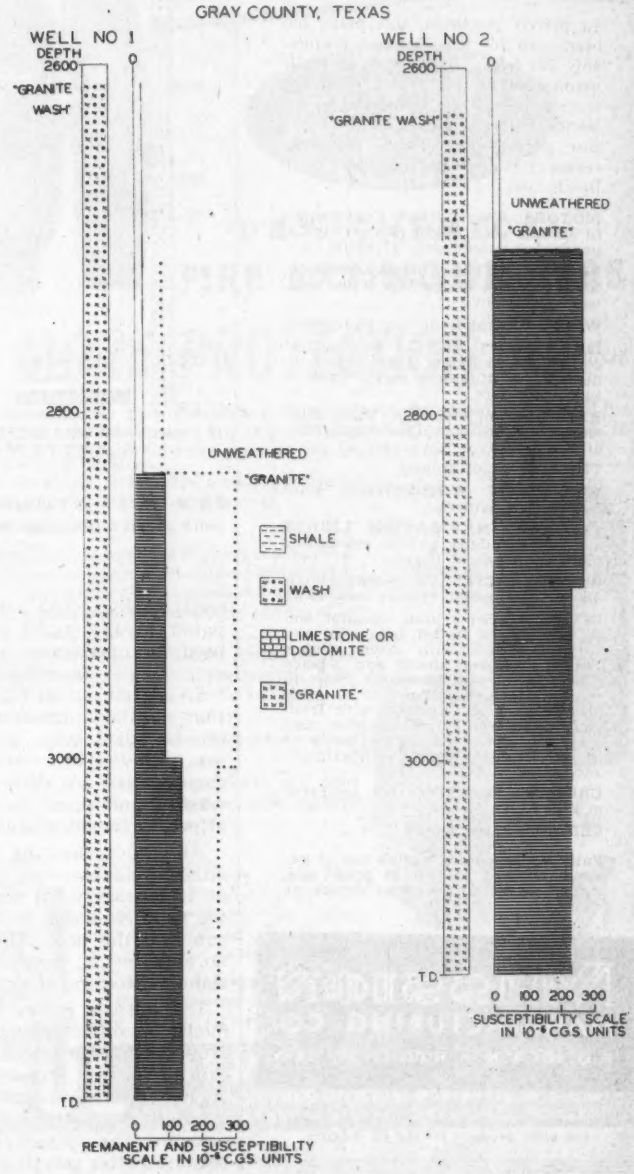


Fig. 5—Well at left went into unweathered solid granite a little below 2,800 ft. Both types of magnetic measurements check closely. Well at right went into unweathered solid granite a little below 2,700 ft. Both wells drilled a lot of wasted footage



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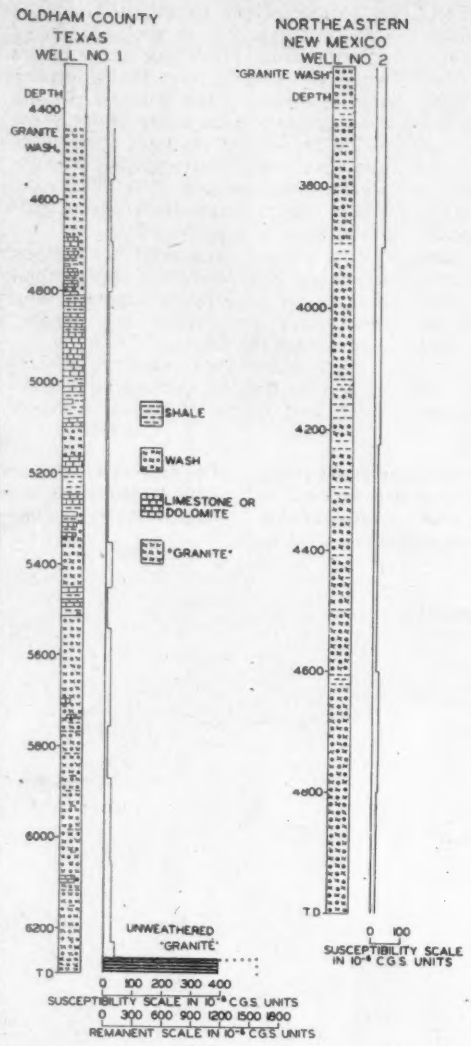

Fig. 6—Well at left stopped drilling pretty close to the mark. Well at the right never did reach unweathered solid granite

well cuttings. The samples are prepared in the usual routine manner used for microscope work. Then one more simple job is added. The sample may contain small fragments of iron that has been knocked or worn off the bit, drill pipe, or casing. These are removed by a small magnet. If the samples are dirty, they may be washed and dried as usual, with no effect on the measurements made.

All the measuring work is done either in a laboratory at headquarters, or if necessary, in a trailer unit at the well. No wires or instruments are run into the hole. The drillers have no extra work; they just follow their standard routine of grabbing samples.

The answer comes from measurements of either one of two magnetic properties of the sample. The scientists call these two properties "the remanent (residual) magnetism" and "the magnetic susceptibility." They usually measure "the magnetic susceptibility" because better results can be obtained in less time from average drill cuttings.

The scientists explain "the magnetic susceptibility" in fairly reasonable language. The granite cuttings contain a number of particles that act just like bar magnets. Each particle has a north and a south pole. The north pole of one particle will attract the south pole of another; but two north or two south poles will repel each other.

Usually these particles (or bar magnets) line up in a haphazard pattern that results in a lot of particles (or bar magnets) canceling each other's magnetic force. (See the left side of Fig. 3.) But when you put them inside a magnetic field, the force of that field causes the particles (or bar magnets) to line up straighter and stop canceling each other's magnetic force. (See the right side of Fig. 3.) After you take the sample out of the magnetic field, the particles (or bar magnets) stay lined up. Therefore when you measure the magnetic force of the sample before and after using the field force on it, you find a much greater magnetic force the second time.

As for "the remanent (residual) magnetism," the scientists define it as the natural permanent magnetism of a rock. The average layman might as well just take the scientists' word that this is something they are sure of and know how to measure. A simple explanation is hard to find.

Detailed discussions of the scientific principles, research, checking, and special instruments designed for measuring samples were first presented at a Mid-Continent regional meeting of the Society of Exploration Geophysicists. A scientific paper on the first three items listed above has been printed in Vol. XIII, No. 2 of "Geophysics."

After they look at the well logs in Figs. 4, 5, and 6, most exploration men, drilling contractors, and operators will agree that these magnetic measurements give a definite answer to a practical problem. The map (see Fig. 1) showing the area where this problem is apt to occur, speaks for itself to oil men.

They know that in this area there is going to be a lot of exploration and development work going on for a good many years to come. It is comforting to know that the scientists have eliminated one headache from the many that will go with this exploration work. No more arguments about when the drilling contractor's obligation has been fulfilled.

Weeks Island Salt-Dome Operations

(Continued from page 60)

have been started with approximately 120 ft. of 16-in. conductor pipe cemented in 22-in. hole. In the first few wells, this was followed with about 2,500 ft. of 10¾-in. surface casing run in 15-in. hole. Through this string of 9⅞-in. hole was drilled for an intermediate protection string, which called for a further reduction in hole size to the sands. Now, approximately 4,500 ft. of surface casing is run and the 9⅞-in. hole drilled to the total depth. In this program, not only are more of the unconsolidated upper formations cased off and protected while drilling to the more troublesome zones, but with the larger hole to bottom greater freedom in drilling the deeper horizons is made possible and any fishing or other work in the hole facilitated

In its mud program, Shell switched first from phosphate muds, which were used in the first few wells, to red muds, and more recently to starch and lime mud. Work of adapting and building up mud usually is well under way by the time a depth of 6,000 ft. is reached. At this depth the water loss is gradually reduced to around 8 cc., and by the time a depth of about 10,000 ft. is reached it is further reduced to at least 5 cc.

A thick shale section topped around the latter depth is one of the greatest potential sources of trouble in all wells on this side of the dome, and requires particularly close control of mud characteristics. As long as the mud is kept in shape, drilling of this formation presents no special problems, but in the event of some mechanical failure or stoppage of drilling from some other cause, the formation tends to cave and slough, and, as a result, stick the pipe. Any work in the hole other than actual drilling appears to aggravate the condition, which makes washing over pipe and fishing unusually difficult and hazardous. Fortunately, only normal pressures have been found so far, and no problems have arisen in maintaining and balancing mud weight. Mud weight is carried around 11.5 lb. per gallon.

Through the provision of large and modern drilling equipment with adequate power and pump capacity it has been possible, however, to minimize the chances of mechanical failures and drilling delays, and also through other precautions to prevent trouble, progress has been made in reducing well time and costs. This is reflected in the fact that wells to 14,000 ft. and below now are being drilled in some instances in fewer than 100 days and at costs of less than $200,000 as against a time of from 275 to 300 days and costs as high as $408,000 in some of the early wells.

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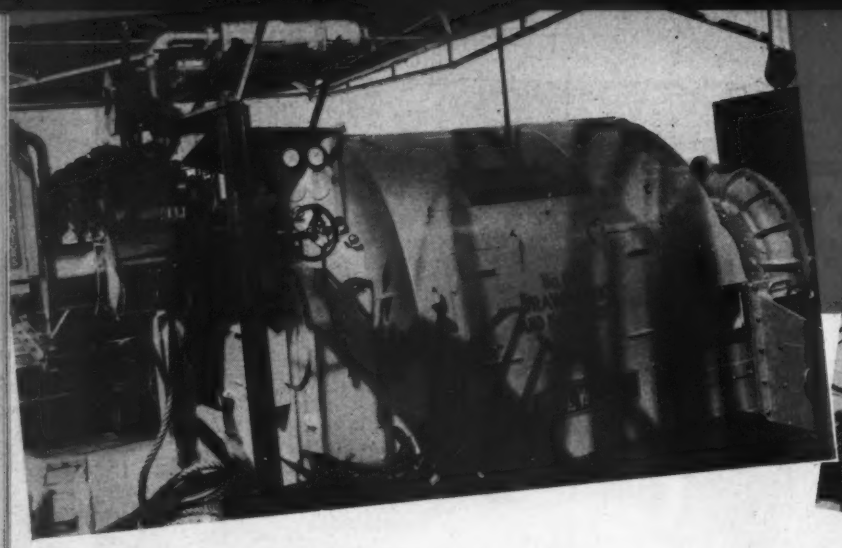

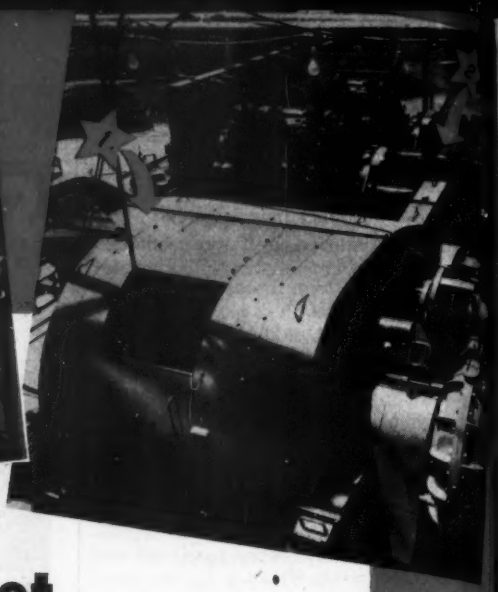

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HERE is a complete drilling outfit designed for fast, economical operations. All major items are engineered to work together—and represent the very latest developments in power-driven rotary equipment for operation within the recommended drilling ranges. Each item is a dependable performer in itself. Together they make up an efficient smooth-running team that does an outstanding job at low overall cost.

1. STURDY, HIGHLY FLEXIBLE "OILWELL" NO. 64-B DRAW WORKS with its recommended companion equipment is readily portable and designed for drilling to 7500 feet with 3½-inch drill pipe and to 6000 feet with 4½-inch drill pipe.

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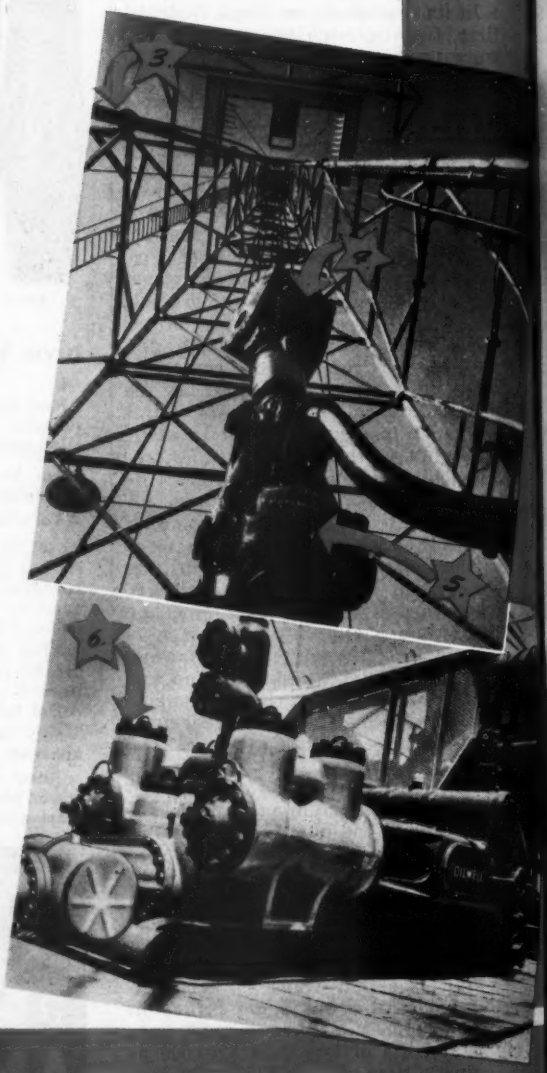

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The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

A. C. Motor Trouble

SYMPTOM AND CAUSE—	WHAT TO DO
MOTOR STALLS:	
Motor loaded more than it should be	Reduce load.
Low motor voltage	See that name plate voltage is applied.
Open circuit	Fuses blown, check relay, starter and pushbutton.
Incorrect control resistance of wound rotor	See that control works in correct sequence, that relays function, replace broken grids.
MOTOR CONNECTED BUT DOES NOT START:	
One phase open	See that no phase is open.
Motor may be overloaded	Reduce load.
Rotor defective	Look for broken bars or rings.
Poor stator coil connection	Remove end bells, locate with test lamp.
MOTOR RUNS AND THEN DIES DOWN:	
Power failure	Check for loose connections to line, to fuses and control.
MOTOR DOES NOT COME UP TO SPEED:	
Too low voltage at motor terminals to line drop	Use higher voltage on transformer terminals or reduce load.
If wound rotor, improper control of secondary resistance	Correct secondary control.
Starting load too high	Check load motor is supposed to carry at start.
Low pull-in torque of synchronous motor	Change rotor starting resistance or change rotor design.
Check that all brushes are riding on rings	Check secondary connections. Leave no leads poorly connected.
Broken rotor bars	Look for cracks near the rings. Usually means a new rotor.
Open primary circuit	Locate fault with available testing device and repair.
MOTOR TAKES TOO LONG TO ACCELERATE:	
Excess loading	Reduce loads.
Poor circuit	Check for high resistance.
Defective squirrel-cage rotor	Replace with new rotor.
Too low applied voltage	Get power company to increase voltage tap.
WRONG ROTATION AT START:	
Wrong sequence of phases	Reverse connection of motor or at switchboard.
MOTOR OVERHEATS WHILE RUNNING UNDER LOAD:	
Check for possible overload	Remove overload.
Motor may not ventilate properly due to wrong blowers or air shields, may be clogged with dirt	Good ventilation is manifest when a continuous stream of air leaves the motor. If not, check manufacturer.
Motor may have one phase open	Check to make sure that all leads are well connected.
Grounded coil	Locate and repair.
Unbalanced terminal voltage	Check for faulty leads, connections, and transformers.
Shorted stator coil	Repair and then check wattmeter reading.
Grounded coil	Locate and repair ground.
Faulty connection	Indicated by high resistance.
High or low voltage	Check terminals of motor with voltmeter.
Rotor rubs stator bore	If not poor machining replace worn bearings.
MOTOR DOES NOT RUN IN BALANCE AFTER CORRECTIONS HAVE BEEN MADE:	
Motor misaligned	Realign.
Weak foundations	Strengthen base.
Coupling out of balance	Balance coupling.
Driven equipment unbalanced	Rebalance driven equipment.
Defective ball bearing	Replace bearing.
Bearings not lined up	Line up properly.
Balance weights shifted or replaced rotor coils	Rebalance rotor.
Polyphase motor running single phase	Check for open circuit.
Excessive end play	Adjust bearing or add washer.
HOT BEARINGS—(S—SLEEVE) (B—BALL):	
(S and B) No lubrication	Check and replenish lubrication.
(B) Danger of too much grease	Open up caps and remove grease.
(S) Oil rings sticking	Repair or replace rings.
(B) Broken ball or retainer	Renew bearings.
(S and B) End thrust	Remove thrust from driven apparatus.
(S and B) Misalignment	Realign.
(S and B) Bearings not in line	Line up or replace.
UNBALANCED LINE CURRENT ON POLYPHASE MOTORS DURING NORMAL OPERATION:	
Unequal terminal volts	Check leads and connections.
Single-phase operation	Check for open contacts.
Poor rotor contacts in control wound rotor resistance	Check control devices.
Brushes not in proper position in wound rotor	See that brushes are properly seated and shunts in good condition.
SCRAPING NOISE:	
Fan rubbing air shield or striking phase insulation	Remove interference.
Loose on bedplate	Tighten holding bolts.
MAGNETIC NOISE:	
Air gap not uniform	Check and correct bracket fits or bearing.
Loose bearings	Correct or renew.
Rotor unbalance	Rebalance.

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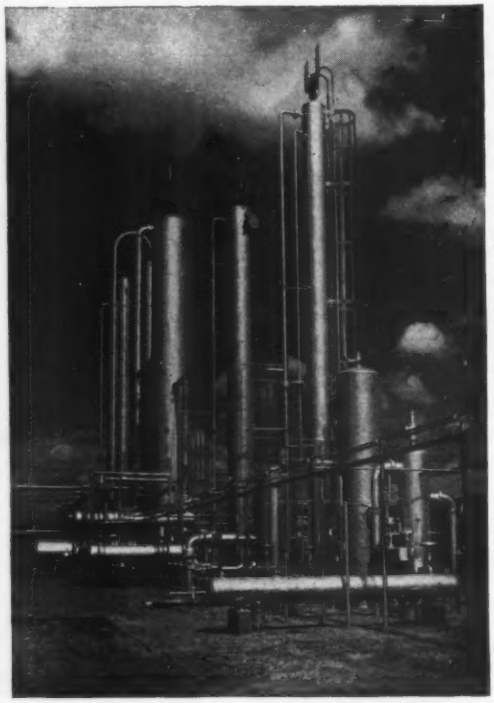

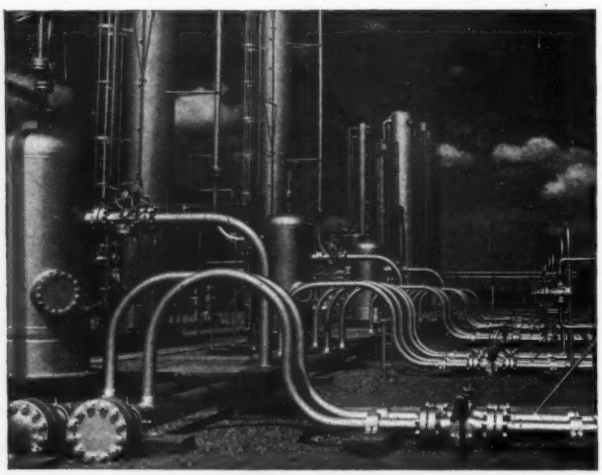

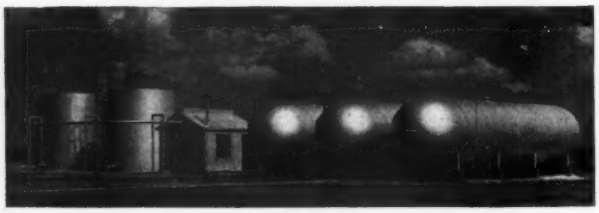

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Steady State Flow in Radial System

CONSIDER the radial system of Fig. 1. Consider that pressures P_e and P_w are constant with time, that the ratio of oil to gas entering the system at R_e and the ratio of oil to gas leaving the system at R_w are constant with time. Further, since flow is steady, the mass of gas and oil entering per unit of time equals the mass of oil and gas leaving per unit of time. Under such conditions, there will be a definite pressure gradient from P_e to P_w and a definite oil saturation distribution from R_e to R_w.

The rate of reservoir oil flow at the radius, r, is by Darcy's law:

$$q_o = \frac{v_o}{A} = 7.07\, r\, h \frac{k_o}{\mu_o} \frac{dp}{dr} \quad (1)$$

where subscripts o refer to the the oil phase and the terms have their usual meaning. This differential equation, expressing dependence of pressure and saturation with radius, cannot be integrated between the limits desired unless further information concerning the variables is at hand.

q_o can be eliminated as a variable because q_o divided by the formation volume factor at the pressure existing at the radius, r, must equal a constant volume of stock-tank oil. That is:

$$q_o = \beta\, Q_o \quad (2)$$

However, this introduces a new variable β. Equation 1 can now be rearranged to read:

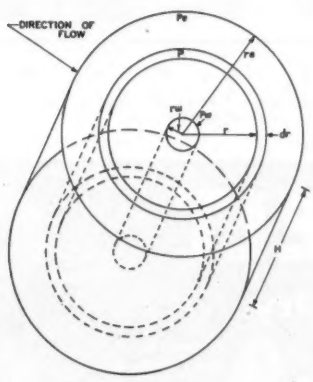


Fig. 1

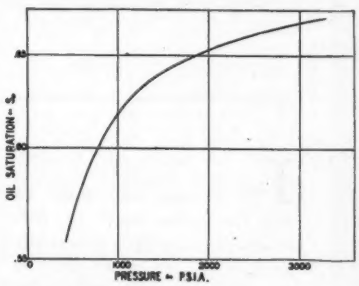


Fig. 2.—Typical variation of saturation with pressure in a steady state radial system. Gas-oil ratio is constant

$$\frac{Q_o}{7.07\, hk}\int_{R_w}^{R_e}\frac{dr}{r} = \int_{P_w}^{P_e}\frac{k_o/k}{\mu_o \beta}dp \quad (3)$$

The term dr/r can be integrated between limits. The term $\frac{k_o/k}{\mu_o \beta}$ can be evaluated as a function of pressure and integrated between limits in the following manner.

The system is at a steady and constant ratio of gas to oil. Let this be expressed at the outflow area by R, the producing gas-oil ratio. It can be shown (Engineering Fundamentals No. 340) that at any radius r in the system, the following relationship between R and the variables exists:

$$R = \frac{k_g}{k_o}\frac{\mu_o}{\mu_g}\frac{\beta}{v} + r_s \quad (4)$$

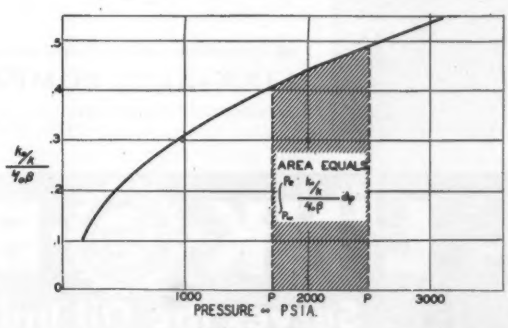


Fig. 3.—Variation of $\frac{k_o/k}{\mu_o \beta}$ with pressure for radial system of Fig. 2

Since R is a constant for the system, pressure and saturation determine Equation 4. For a given R value, therefore, a plot of pressure versus saturation can be made, saturation giving k_g/k_o and pressure giving μ_g/μ_o, β, v, and r_s. Fig. 2 is such a plot for an oil with defined characteristics and a reservoir rock with a defined relative permeability curve.

Having determined dependence of pressure and saturation within the system, k_o/k values can be determined for the saturation at a given pressure and the term $\frac{k_o/k}{\mu_o \beta}$ can be evaluated and plotted against pressure. Such a plot is shown in Fig. 3. The right-hand side of Equation 3 can now be integrated graphically by taking the area between values of P_e and P_w under the curve as shown, which numerical area is the desired value of the integral. Thus, the following is obtained:

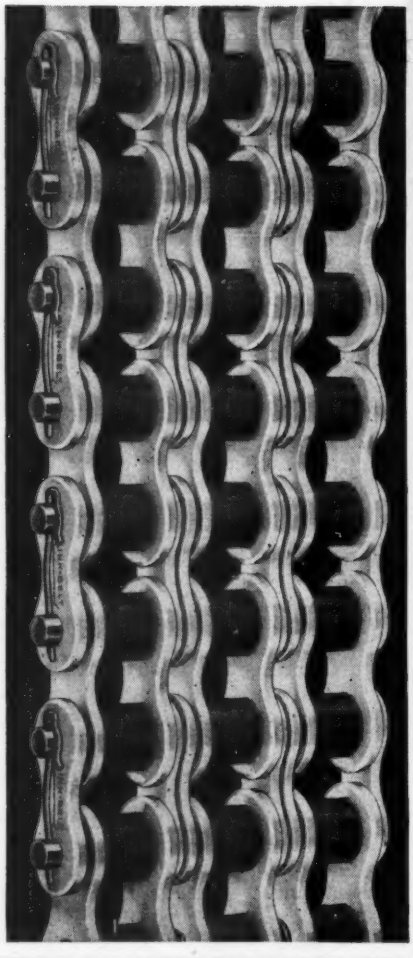
$$Q_o = (\text{area under curve})\frac{7.07\, kh}{\ln \frac{R_e}{R_w}} \quad (5)$$

Nomenclature

P_e = pressure at radius of drainage, psia.
P_w = pressure at sand face, psia.
R_e = radius of drainage, ft.
R_w = radius of well bore, ft.
q_o = volume rate of oil flow at radius r, bbl. per day.
v_o = apparent oil velocity at radius r, ft. per day.
h = height of radial system, ft.
k = permeability of formation, darcies.
k_o = specific permeability to oil at saturation of radius r, darcies
k_g = specific permeability to oil at saturation of radius r, darcies.
β = formation volume factor at radius r.
Q_o = stock-tank volume rate of oil flow, bbl. per day.
μ = viscosity of reservoir oil at radius r, centipoises.
μ_g = viscosity of reservoir gas at radius r, centipoises
v = conversion factor standard cubic feet of gas to barrels of reservoir gas.
r_s = gas in solution at radius r, standard cubic feet per barrel of stocktank oil.
ln = logarithm to base e.
A = cross-sectional area of flow at radius r, square feet.

Series by Dr. John C. Calhoun, Jr., Chairman, Petroleum Engineering School, University of Oklahoma

Pulling Power for Heavyweights



IT'S a long way down to the "business end" of this hole . . . more than two miles in fact. That's more than a four-mile round trip for nearly 100 tons of drill pipe, and calls for top-notch drives. On internal combustion power driven rigs like this one that usually means Link-Belt Silverlink Finished Steel Roller Chain on the drawworks drives. So well has this strong, flexible, accurately-finished all-steel chain performed under toughest-known drilling conditions in most fields of the world that it continues to widen its margin of popularity among the men who build, the men who buy, and the men who operate drilling rigs.

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PIPE LINES

Authority Sought for 990-Mile, 20-in. Line

PIEDMONT NATURAL GAS CORP. has filed an application with the Federal Power Commission seeking authority to construct a natural-gas pipe-line system beginning in the upper Gulf Coast gas fields in Texas and Southwest Louisiana, extending through five southern states and terminating at Danville, Va.

Cost of the project has been estimated at $75,444,000, including an allowance for working capital.

The line would be about 990 miles long and would be constructed entirely of 20-in. pipe. The company plans construction of 12 compressor stations having a total of 87,000 hp. Capacity of the line would be 215,000,000 cu. ft. per day.

The company proposes to transport the gas and sell it in South Carolina, North Carolina, and Virginia. No firm contracts for purchase of gas have been made, but negotiations are now being carried on, the company said. Negotiations also are under way for sale of the gas to distributing companies, the application said.

Piedmont is a new corporation, recently organized for the sole purpose of building and operating the proposed line, the application said. Incorporated in Delaware, the company has its main offices in Spartansburg, S. C.

Mississippi River Fuel To Test New Turbine

Mississippi River Fuel Corp. in cooperation with Westinghouse Electric Corp. and Ingersoll-Rand Co. will conduct a 6-month trial of a 2,000-hp. combustion gas turbine to start early in 1949. The turbine will drive an Ingersoll-Rand centrifugal compressor at 8,750 r.p.m.

The combustion turbine to be tested has recently completed 1,000 hours of operation at the Westinghouse Turbine Division, Essington, Pa. The Mississippi River Fuel trial will be on the Monroe, La.-St. Louis, Mo., line.

This is expected to be the first application of a mechanical drive combustion gas turbine in industry in this country. The gas turbine has many advantages which promise wide industrial and transportation use in the future. Producing more power per pound of weight than any other present day power plant, it requires only a simple, inexpensive concrete mat foundation and can be trucked into remote undeveloped regions. It can be set up and made ready to operate in a few hours. It needs no water and very little lubricating oil. Maintenance problems are minimized because of the few moving parts.

In addition to this application, Westinghouse has plans for building a gas turbine powered locomotive.

3,574 Miles of Gas Lines Authorized in First Half

Natural-gas companies were authorized during the first 6 months of this year to build 3,574 miles of new pipe lines, increasing daily delivery capacity by 878,500,000 cu. ft., the Federal Power Commission reported last week.

Major projects, those involving more than $700,000, are estimated to cost more than $233,200,000, the FPC said.

Largest single authorization was that issued to Trans-Continental Gas Pipe Line Co., Inc., for construction of an 1,840-mile line from Texas to New York City. The line, estimated to cost more than $151,000,000, will have a capacity of 340,000,000 cu. ft. daily.

During the fiscal year ended June 20, the FPC said, certificates were issued covering 8,468 miles of pipe lines and installation of compressor units aggregating 531,453 hp.

N.A.C.E. Coordinates Corrosion Activity

For reducing duplication and increasing the efficiency of various technical societies on corrosion problems, the National Association of Corrosion Engineers has accepted responsibility for carrying on the functions of the war-born American Coordinating Committee on Corrosion, now called the Inter-society Corrosion Committee. It will have a member from each of a number of societies and associations working on corrosion problems.

N.A.C.E. has been campaigning to extend to other industries its memberships on the premise that solving corrosion problems requires the pooling of experience as well as the conduct of research.

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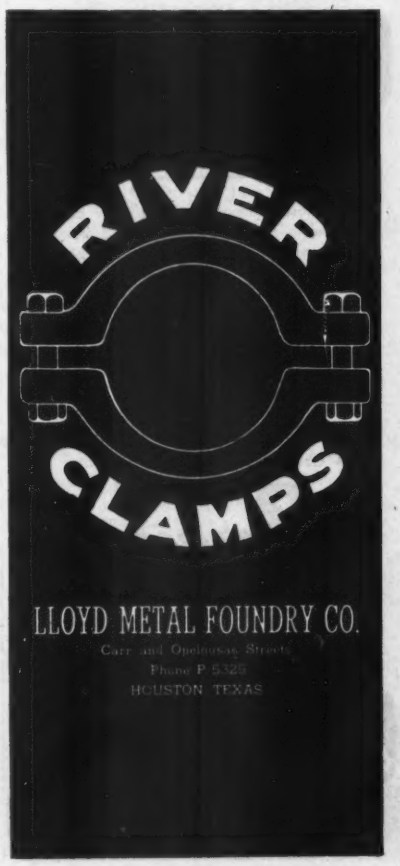

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which directly and indirectly is costing industry about $1,000,000,000 each year, N.A.C.E. sparks the Correlating Committee on Cathodic Protection which is sponsored officially by it and the Association of American Railroads, American Gas Association, American Petroleum Institute, American Public Works Association, American Water Works Association, Edison Electric Institute, International Municipal Signal Association, Inc., United States Independent Telephone Association, Bell Telephone System, and Western Union Telegraph Co. This group seeks through education of managers and engineers to reduce corrosion of buried metal structures including 988,000 miles of oil, gas, and water pipe, 167,000 miles of metal-sheathed communications and power cable, and 425,000 miles of rail track much of which is protected by signal systems.

Big West Texas System Up to 90,000 Bbl. Daily

Crude-oil movements reached 92,000 bbl. daily on August 25 through the four-company, 343-mile line already completed from Jal, N. M., to Wichita Falls, Tex. This represents an advance beyond the 70,000 bbl. daily throughput which has characterized operations up to last week. Increased throughput has been due to installation of additional temporary pumps.

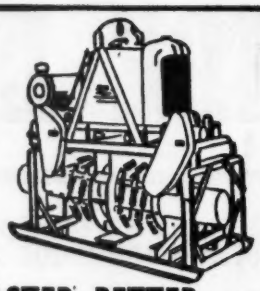
Deliveries from the line for Sinclair Refining Co. are being made through a connection with that company's pipe-line system at Geraldine, Tex., in the Holliday area, for movement to Houston.

Tank cars are being loaded from the line through two loading racks on the Missouri, Kansas & Texas Railroad tracks at Wichita Falls. These two loading racks, owned by Texas Pipe Line Co. and Shell Oil Co., Inc., are capable of handling the full throughput capacity of the system.

It is anticipated that the rack will continue to be operated until the entire system is completed to Wood River. This system is designated by Texas Pipe Line Co. as the Jal-Cushing-Wood River-Salem system. The sections to Wood River are regarded as the Basin and Ozark systems by Shell. The Jal-Cushing system parallels the Shell crude-oil line from Westbrook to Archer station, where it extends north to northeast to Wichita Falls. Smith Contracting Co. is now laying the Wichita Falls-Cushing section consisting of 173 miles of 24 in.

Six Spreads to Go On Ozark Project

Shell Pipe Line Corp. will issue specifications and ask for bids in September for laying 435 miles of 22-



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Model M—2" to 16" pipeline machine.
Model K—16" to 30" pipeline machine.

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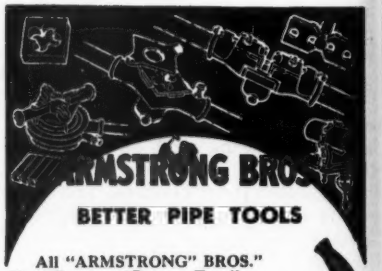

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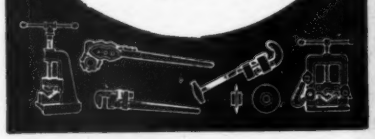

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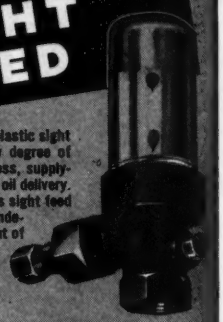
"CLEARSITE"
SIGHT
FEED



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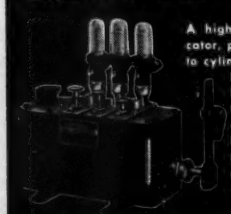

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in. for the Ozark system from Cushing, Okla., to Wood River, Ill. Work will get under way at the end of October when pipe will begin to arrive from Youngstown Sheet & Tube Co.

Six spreads will go in the field in October including a river crossing spread.

The route of the Ozark system follows that of Shell Pipe Line Corp. generally from Cushing, Okla., to Oetters Station, Missouri, where it diverges to cross the Missouri River, going south of Weldon Springs, Mo., and near Orchard Farm to a crossing of the Mississippi River west of Wood River, Ill.

The existing crude-oil trunk line of Shell Pipe Line Corp. extends through the airport area of Lambert County, Missouri, to a crossing of the Mississippi River near Chain of Rocks bridge.

Laying Trans-Continental Line to Begin May 1949

Trans-Continental Pipe Line Co. will commence laying pipe for its 1,800-mile, 26-in. natural-gas pipe line in May 1949. The project will be completed from Mercedes, Tex., to New York City at the end of 1950.

Preliminary work on the right-of-way and at station sites will begin this fall. Engineering work is being done under the direction of Ray Fish, Fish Engineering, Houston, Tex.

Pacific G. & E. Prepares For Big Inch Line

In the program of preparation for the construction of Pacific Gas & Electric Co.'s 500-mile, 30-34-in. line from Needles to San Francisco, to be started in 1950, the company has had Joseph Love, engineer, visit construction operations in Texas during the past week.

On this trip he observed operations for laying 210 miles of 30-in. and 31-in. for Tennessee Gas Transmission Co. near El Paso and Jasper, Tex.

Conyes Is Named Vice President of Bechtel

R. A. Conyes, president of Conyes Construction Co., has been made vice president of Bechtel Corp. as a step in the program by which an organization has been formed as a joint venture known as Bechtel - Conyes. Conyes has no financial interest in Bechtel Corp.

Through the formation of Bechtel-Conyes, Conyes becomes head of all Bechtel pipe-line construction operations in the United States. His participation in the Bechtel contracts with Trans-Arabian Pipe Line Co. continues unchanged.

A PIG FOR EVERY
NATURAL GAS
PIPE CLEANING PROJECT

ILLUSTRATED ARE THREE WILLIAMSON PIGS* FOR CLEANING 24" LINES, ONE FOR 10" LINES

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- (2nd) **Type RN** Pig with 2 sets of rotation nozzles; by-pass gas purges brush bristles; brushes may be shimmed to compensate for wear.
- (3rd) **Type RCN** Pig with single row of rotation nozzles; new compact design for traversing long-radius factory ells. Light weight construction.
- (4th) Small size, **Type RCN** Pig, improved model will negotiate sharp bends; equipped with nozzle plugs for control of by-pass gas.

*Patents pending

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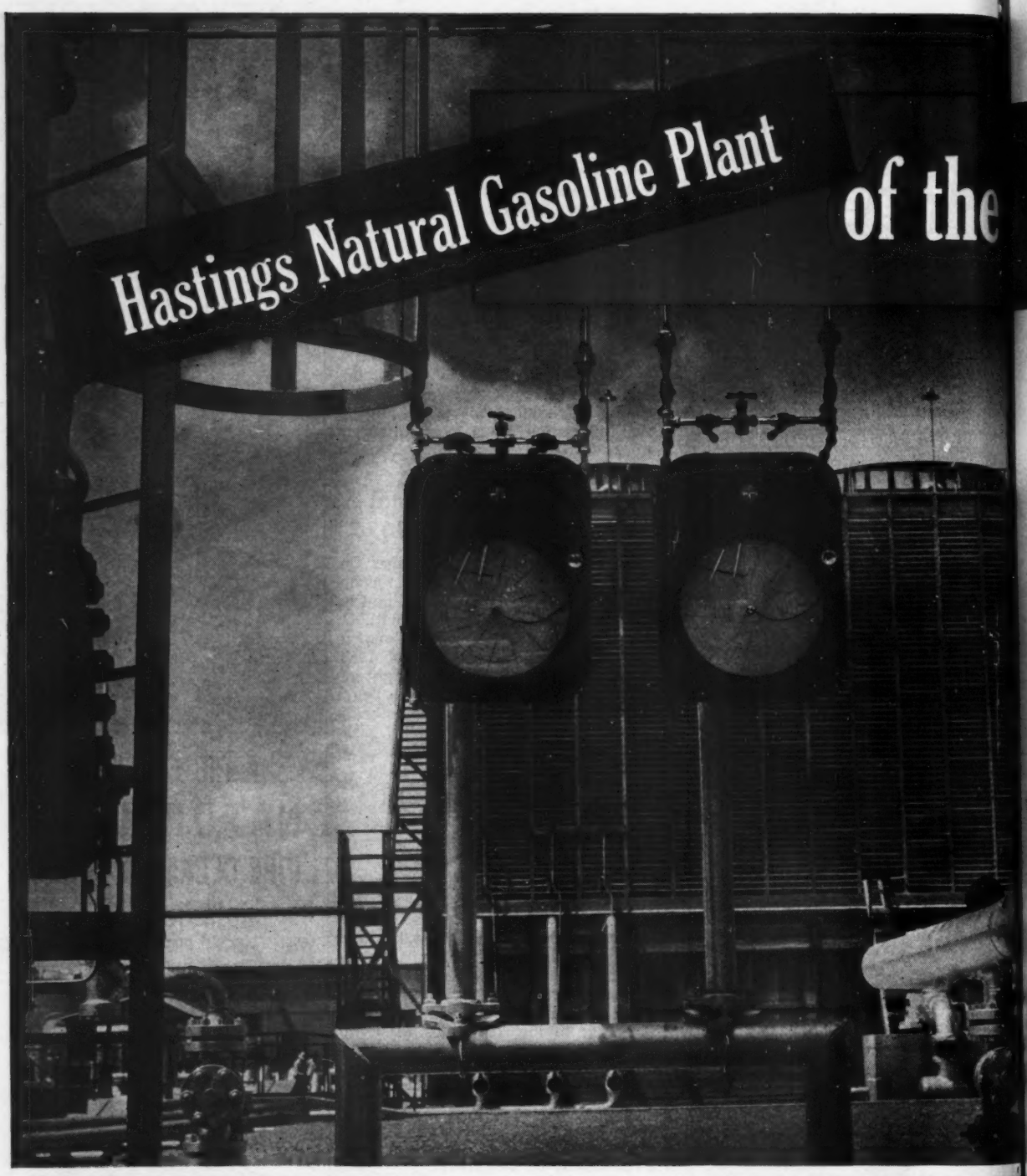
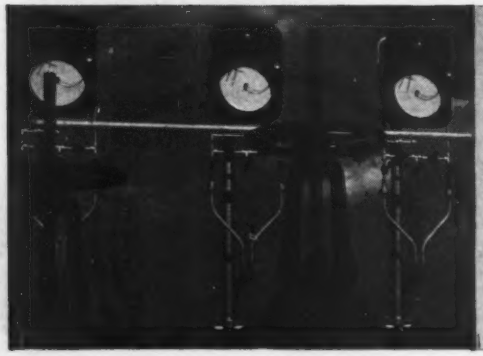
Hastings Natural Gasoline Plant of the St

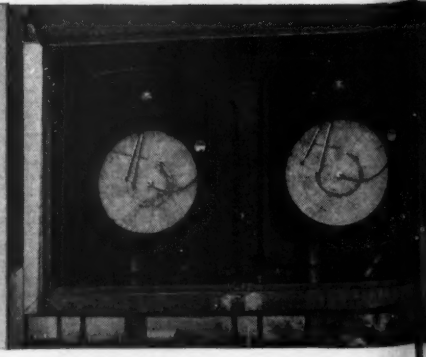




TOP: Dry gas overhead from absorbers

LEFT: Ahead of Compression. Three field mains equipped with Metric Orifice Meters deliver into a header

RIGHT: Twin Metric Orifice Meters on a Hastings lease. One for measuring wet gas from field gathering system, the other for dry gas used in field operations



The Stanolind Oil and Gas Company

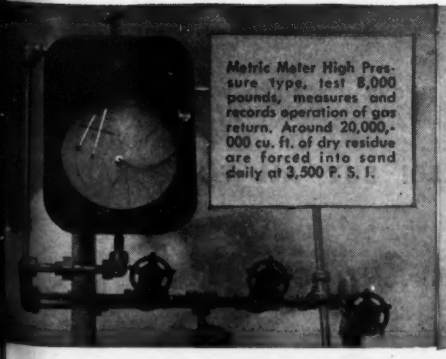
HAS INSTALLED HIGH PRESSURE METRIC ORIFICE METERS

Gas cycling and maintenance operations at the Hastings Plant call for pressures varying from slight vacuum for rich or wet gas to 3,500 P.S.I. when dry gas is pumped into the wells for gas lift and conservation purposes.

Efficient operation of this plant with a daily throughput of 35,000,000 cu. ft. calls for measuring instruments of highest accuracy and dependability.

Metric Orifice Meters are effectively serving the exacting requirements of this plant at Hastings. The California Company's Lake St. John and Cranfield Plants; Shell's Sheridan Plant; Humble's Katy, Tom O'Connor, Anahauc, Clear Lake Plants, and others are demonstrating the suitability of Metric Orifice Meters for high pressure applications up to 5,000 P.S.I.

WRITE FOR FULL INFORMATION


Metric Meter High Pressure type, test 8,000 pounds, measures and records operation of gas return. Around 20,000,000 cu. ft. of dry residue are forced into sand daily at 3,500 P. S. I.

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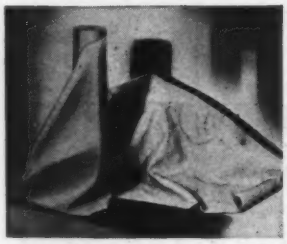

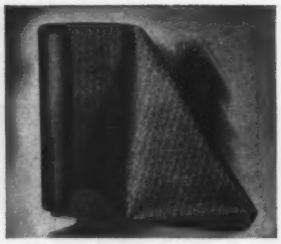

Upper left:
GARLOCK 22 Red Rubber Sheet Packing

Upper right:
GARLOCK 660 Cork-Fibre Sheet Packing

GARLOCK 7021 Compressed Asbestos Sheet Packing

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GARLOCK 660 Cork-Fibre Sheet Packing combines granulated cork and vegetable fibre into a strong compressible sheet, treated with an oil resistant binder. An ideal gasketing material for oils and solvents at temperatures up to 212° F.

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REFINING

Recent O.I.T. Reports Are Now Available

Technical reports describing processes for the manufacture of synthetic liquid fuels and carbonization of oil shale recently made available by the Office of Technical Services, Department of Commerce, include the following:

"Carbonization of Oil Shale"—by Dr. Walter H. Oppelt. The report includes plans and processes for a commercial plant for the daily production of 8,500 bbl. of crude shale oil as well as a pilot plant designed to provide basic information on various phases of commercial oil carbonization. Detailed drawings of both projects are included in the report.

"Production of Liquid Fuels from Coal, Lignite, and Oil Shale in Europe"—by Otto Hubmann. The report gives a general picture of European developments in the production of fuel from shale.

"High Pressure Hydrogenation in Germany, The Liquid Phase"—by Peter W. Sherwood of the Mellon Institute for Industrial Research. The report is "a chemical engineer's view of one phase of the process which was by far the main source of synthetic liquid fuels consumed in Germany during the war years."

Imperial Considering Edmonton Expansion

Imperial Oil, Ltd., now has under consideration plans for expanding its Edmonton refinery to enable it to process 11,000 bbl. of Leduc field crude oil daily. Cost of the proposed expansion program has been estimated at $2,500,000.

The refinery, in operation little more than a month, is now processing 4,000 bbl. daily and is expected to be handling a throughput of 6,000 bbl. daily by the end of the year.

The refinery, originally installed at Corpus Christi, Tex., and later moved to Whitehorse, Yukon Territory, was bought by Imperial from the United States Government, dismantled and shipped to its present site by truck and rail. Its present layout includes cracking and distillation facilities. The possibility of incorporating lubricating-oil manufacturing equipment is now under consideration.

It is designed to produce a full range of motor fuels, kerosine, tractor distillate, heating oils, diesel and heavy fuels, and other products. H. H. Moor, who has been connected with the Imperial organization since his graduation from the University of Toronto in 1923, is superintendent of the new refinery.

Ohio Standard Puts River Terminal in Operation

The Standard Oil Co. (Ohio) oil products receiving and distributing terminal which is nearing completion has already been placed in operation at Tiltonville on the Ohio River. The new $600,000 marketing and bulk plant is one of four to be built by the company along the river. Other major terminals will be located at Portsmouth, East Liverpool and Marietta.

The Tiltonville terminal will handle all types of fuel oil, diesel oil, gasoline and kerosine. It has four tanks with a capacity of 420,000 gal. each, and a fifth with a capacity of 840,000 gal. Six smaller tanks have a combined capacity of 102,000 gal. and will handle byproducts.

Three Licensed to Use Hypersorption Process

Hypersorption process units have been licensed to Dow Chemical Co., Rohm & Haas, and Lone Star Gas Co., according to Reese H. Taylor, president of Union Oil Co. of California, which developed the process. The process is licensed by Foster Wheeler Corp.

Taylor said also that Union now is designing its own large commercial unit for the production of ethylene, using data obtained through operation of its pilot plant at the Wilmington refinery.

Sales of Oil Burners Will Increase, Matheson Says

A sharp increase in the sale of oil burners during the last half of 1948 was forecast last week by W. A. Matheson, executive vice president of Eureka Williams Corp.

Matheson, chairman of the publicity and legislative committees of the Oil Heat Institute of America, said he had conferred "with oil-industry leaders" and now is "quite sure no user of a power oil burner will want for oil this year."

Thus far in 1948, he said, the

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number of power oil burners installed has been well below that which "oil producers said they could supply."

Esso Grease Plant to Go Into Operation This Fall

A new plant for large-scale production of lime-soap greases by a continuous process will go into production early this fall at the Baltimore refinery of Esso Standard Oil Co.

The key unit in the new process is a rapid soap cooker, which blends the lime, animal or vegetable fats, and oil in a continuous process. The process, which formerly took 3½ hours, is now completed in 45 minutes. The rapid cooker consists of a heat exchanger and three tanks, each of which will hold 2,000 lb. of soap mix.

Several devices give the new continuous process its great precision and economy of operation, materials and time. One of the major achievements is the mixer, which blends soap and oil so well that less soap, in proportion to oil, yields an identical grade of grease.

Income From Oil Taxes Shows Gain Over 1947

WASHINGTON.—Treasury revenue from the three federal oil taxes ran close to $48,000,000 in July, approximately $2,500,000 above that for the corresponding month last year, it was announced last week by the Internal Revenue Bureau.

The month's collections included $40,715,754 from gasoline, against $38,581,556 in July, 1947; $5,599,746 from lubricating oils, against $5,558,429; and $1,670,613 from pipe-line transportation, against $1,349,430.

For the first 7 months of the calendar year, the bureau figures revealed, collections from the three levies ran 10 per cent above the same period in 1947, with gasoline returning $267,395,764 against $241,972,061, lubricating oils $47,511,706 against $45,232,777, and pipe-line transportation $11,351,095 against $10,286,827.

Shell Chemical Completes Another Unit at Houston

Shell Chemical Corp. has completed its plant at Houston, Tex., for the manufacture of synthetic ethanol and other products. Full-scale production will get under way soon.

The product will be offered as a proprietary solvent under the trademark "Neosol," and in standard specially denatured grades approved by government authorities.

Another of the units which was recently completed at the Houston site is the new plant for the manufacture of methyl ethyl ketone and secondary butyl alcohol.

Shell Chemical's $8,000,000 commercial synthetic glycerin plant, which is nearing completion, is expected to go on stream by late this summer or early fall.

New Lubricating Oil

A new supercharged lubricating oil for diesel engines—R.P.M. Delo—has been announced by Standard Oil Co. of California. The new oil, developed by California Research Corp., has greatly extended the period between engine overhauls, company officials said.

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NATURAL GAS

California Production Will Drop, FPC Is Told

CALIFORNIA'S oil and gas production will reach its peak next January and then begin a steady decline, was the prediction of Roy M. Bauer, gas supply supervisor for Southern California Gas Co. and Southern Counties Gas Co. of California.

Bauer presented his estimates at a hearing which began last week before the Federal Power Commission on applications of the two southern California gas companies and El Paso Natural Gas Co. for authority to increase the delivery capacity of the 1,200-mile Texas-California pipe line by 180,000,000 cu. ft. of natural gas daily.

Bauer told the commission his studies showed that gas production from all California fields, now approximately 1,540,000,000 cu. ft. daily, will increase by 20,000,000 cu. ft. per day in January of next year, then drop to 1,100,000,000 cu. ft. by January 1954. He said that the state's present oil production of 955,000 bbl. daily will increase to 970,000 bbl. in January 1949, and then begin a continuous decline of approximately 20,000 bbl. in each 6 months' period to 770,000 bbl. by January 1954.

No allowance for new discoveries was made in his studies, Bauer told the commission.

C. C. Cragin, vice president and general manager of El Paso Natural Gas Co. told the commission last week that the company planned to take into consideration possible future gas deliveries to northern California.

Combined costs of the new construction are estimated at about $66,000,000. This will bring the original investment of the entire project to a total cost of more than $150,000,000. The line's present capacity is 305,000,000 cu. ft. daily to California and it is planned to increase this to 405,000,000 cu. ft. The proposed additional 80,000,000 cu. ft. will supply the El Paso-Arizona-New Mexico areas.

Paul Kayser, president of El Paso Natural Gas Co. told the commission that the unprecedented demand in California was due to the tremendous growth in population of the state. Records show an increase in the state's population since 1940 of about 42 per cent, or approximately 3,000,000. Kayser expressed the hope that construction might begin by November 1 and that prospects were that the project might be completed by the end of 1950.

New York State Natural Program Is Approved

The Federal Power Commission has authorized New York State Natural Gas Corp. to construct natural gas pipe-line facilities in Pennsylvania estimated to cost $3,208,727.

The order authorizes construction of a $890,000 compressor station in Franklin Township, to contain six 600-hp. gas engine-driven compressors. The station is expected to enable the company to increase deliveries from Hope Natural Gas Co. and Texas Eastern Transmission Corp. from 80,000,000 cu. ft. to 108,700,000 cu. ft. daily.

Also the company is authorized to build a total of 26 miles of 16-in. line paralleling an existing line south from near Tonkin station; about 24 miles of 16-in. line north from a point near Rassalas; and about 12 miles of 16-in. line extending north from the vicinity of Hemphill.

Upon completion of these facilities the company expects to have a daily delivery capacity at Pew station of 130,000,000 cu. ft. and 107,000,000 cu. ft. north of Pew.

FPC Consolidates Hearing, September 8

The Federal Power Commission will hold a consolidated hearing beginning September 8 on applications filed by United Gas Pipe Line Co. and Tennessee Gas Transmission Co. for authorization to construct natural-gas transmission facilities in Mississippi.

Proposed facilities of United Gas include lateral lines consisting of 6½ miles of 6-in., 47 miles of 4-in., and 29 miles of 2-in. as extensions from points on Tennessee Gas Transmission Co.'s 24-in. main line in northern Mississippi. Cost of extensions and appurtenant equipment is estimated at $799,700.

Tennessee Gas proposes to construct eight sales meter stations on its main transmission line for the sale and delivery of natural gas to United Gas. Tennessee Gas has contracted with United to deliver up to 8,766,000 cu. ft. of gas daily for the first 5 years following the first delivery.

United Gas' Rate Supplement Suspended

The Federal Power Commission has suspended, pending hearing, a proposed supplement to United Gas Pipe Line Co.'s rate schedule covering sales of natural gas to Texas Gas Transmission Corp. The supplement proposed to bill Texas Gas for increased taxes imposed by the state of Louisiana. United estimated that for the year beginning July 1, 1948 the increase in charges to Texas Gas would be $25,980, or 8.7 per cent.

The suspension of the proposed supplement by FPC is in line with the commission's policy recently laid down that changes in rate schedules of natural-gas transmission companies resulting from increases in taxes may not be put into effect until reviewed, despite tax adjustment clauses in contracts.

A.G.A. Will Study Industry's Problems

A study of some of the urgent governmental, social, and economic problems confronting the industry will feature the meeting of the natural-gas department of the American Gas Association as a part of the thirteenth annual convention of the A.G.A. and exhibition of the Gas Appliance Manufacturers Association in Atlantic City, N. J., October 4-8.

The first of the three general sessions scheduled will be opened with an address by Hudson W. Reed, president of the A.G.A., and president of Philadelphia Gas Works Co. His subject will be "Facing Facts in the Gas Industry."

Robert W. Hendee, first vice president of the association, and president of Colorado Interstate Gas Co., Colorado Springs, will preside as chairman at the natural-gas department's meeting.

The association predicted more than 10,000 persons from all phases of the gas industry would attend the convention making it the largest A.G.A. convention held.

Natural Gasoline

New Cycloversion Unit Goes Into Operation

HOUSTON.—The 3,500-bbl. daily-capacity cycloversion unit has gone into operation at the natural-gasoline plant of Absorption Plant, Inc., a McCarthy Oil & Gas Corp. subsidiary, at Winnie, Tex. The unit, which is used to improve octane rating and quality of products, was contracted by Fish Engineering Corp., of Houston.

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Among the

Drilling Contractors

L. D. Cain Drilling Co., Houston, is below 2,800 ft. in 6,200-ft. test for Gulf Oil Corp. in Hull field, Liberty County, Texas Gulf Coast area. The well is 25 E. M. Scarbrough.

T. P. Pike Drilling Co. has contract to drill another well for J. P. Getty at Northwest Athens after completing Howard Park Fee 1 in the same field. Pike also has contract to drill Bell 1 for Union Oil Co. of California at Santa Fe Springs.

Lewis Drilling Co. and J. M. Huber Corp. are rigging up at the 1 Bargdill, NE NE NE 25-25-11, a wildcat test in southeastern Stafford County, Kansas, 3½ miles southeast of revived Neola pool.

Flamingo Drilling Co. and Flamingo Oil Co. have been organized by George S. Engle, Evansville, Ind., operator who recently purchased two rigs from Pioneer Drilling Co.

Walter Hale Drilling Co. is moving portable rotary outfit to the Quaich area in the southern Alberta foothills, to drill Quaich 2 in LSD 4, 35-9-3w5. Quaich 1, LSD 12, same section, a cable-tool test, has been shut down at 2,485 ft. owing to drilling difficulties. The area was favorably reported on by the late E. H. Cummingham Craig.

B & R Drilling Co. and Delta Production Co. were preparing to test the 1 Kelly, NW NW SE 35-23-12, 2 miles north of Stafford pool and 2 miles southeast of Bedford pool, in central Stafford County, Kansas. Same firms were also testing the 1 Hildebrand, in NW NW SE 2-24-112.

Rocky Mountain Drilling Co. will drill Standard Oil Co. of California's Del Aliso 3 in Aliso Canyon field. Rocky Mountain also has contract for Seaboard Oil Co.'s Community 7-1 at Lawndale.

Cook Drilling Co., Fort Worth, Tex., has contract and is moving Wilson Titan rig to drill Southern Production Co.'s unit, Section 36, 34-North, 91-West, Fremont County, Wyoming. It is to be a 7,500-ft. Madison test.

Boyles Bros. Drilling Co., Salt Lake City, Utah, has been awarded the con-

This Nicklos Drilling Co. crew is on 1 E. G. Sladous which Nicklos is drilling for Gulf Oil Corp. on the north flank of Mykawa Dome a few miles south of Houston. The deep test, located on a 61.1-acre lease in the William J. Lovett Survey, A-526, is now below 8,000 ft. In the picture are: A. M. Salter, driller; V. B. Sullivan, tool pusher; P. C. Froehlich, Roy Hayes and Herbert Wilburn, all helpers; and Archie Wilburn, derrick man

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Loffland Brothers Drilling Co. will drill Hunt Oil Co. 1 LLE & Co., wildcat test, in Township 22s-15e, Terrebonne Parish, Louisiana. Contract depth is 12,000 ft.

Brewster-Bartle, Houston, has contract for Sun Oil Co. C-19 Braman, Sugar Valley field well, in Matagorda County, Texas Gulf Coast. It is a scheduled 9,050-ft. job.

Keyes Drilling Co. was preparing to drill the plug at the 1 Knipp, NE NE SE 33-19-11, ½ mile northwest of Silica pool production in eastern Barton County, Kansas. Five-inch casing was cemented at 3,325 with the top of the Arbuckle marked at 3,324, minus 1,545 ft.

Dixie Drilling Co. is moving in rig to drill Union Oil Co. of California 1 N. J. LeBlanca, in Tigre Lagoon field of Vermilion Parish, Louisiana. Contract depth is 12,000 ft.

Fowler Drilling Co. has been awarded contract for Richfield Oil Corp.'s Coal Oil Canyon 83-29 at Wheeler Ridge in California.

Suntex Drilling Co., Oklahoma City, will drill 1 Thompson in NW NW NW of 1-12n-5e, ½ mile east of production in Wilzetta pool of Lincoln County, Oklahoma. The new operation is separated from the pool production by a 4,566-ft. dry hole in NE NW NE of Section 2. Another previous test was a 4,668-ft. failure in NE NE NW of Section 1.

Loffland Brothers have the contract for a 12,000-ft. wildcat for The Chicago Corp. in the Miltonberg area in Rapides Parish, South Louisiana. The well is 1 W. E. Carter, in Section 63-4n-2w.

Pacific Drilling Co. has contract for Indian Oil Co.'s 2 Wanda Kraft in the Placerita Creek area near Newhall, Calif.

Stamme-Scheele, Inc., have contract to drill three tests for J. C. Gordy, Minos Gordy, and Walter Gordy, in Rabbit Island pool of St. Mary Parish, Louisiana. The tests are A-1, A-2, and A-3 Rabbit Island-State Lease 340, and all are to be drilled to the salt.

Meredith, Clegg & Hunt, Houston, are rigging up an 11,000-ft. test for Western Natural Gas Co. The 1 Ed Zengerlie et al is located 11,000 ft. southwest of Thomaston field in southeastern DeWitt County, Texas.

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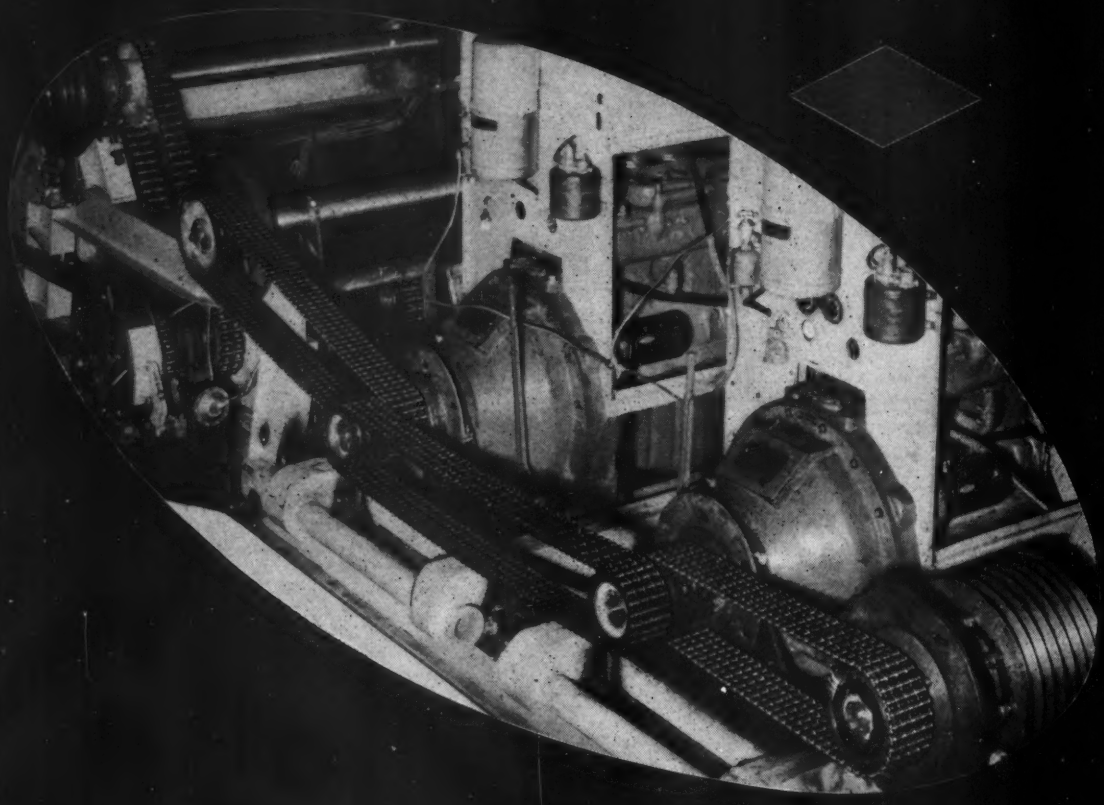

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Exploration and Drilling

Wildcat Drilling Program for 1948 vs. Crude Reserves

WE need to find about 4.5 billion barrels of new crude oil in 1948 from new pools and pays or extensions and revisions in existing fields if we are to maintain the same ratio of reserves to production that has existed in the past.

The current all-out wildcatting campaign as shown by completions in the first half of the year and by drilling plans for the last half, tabulated in The Oil and Gas Journal's Midyear Report (July 29, 1948), is a direct result of the need to maintain the high level of crude production and to keep a good backlog of crude reserves to assure high production in the years to come. The high demand for petroleum products has brought needed increases in the price of crude to stimulate development drilling, and the outlook for continued high demand has spurred efforts to find new pools for future development.

Crude reserves for the past few years have been about 12 to 13 times crude production and with the prospects for continuing high demand over the next few years it seems desirable to keep this ratio of reserves to production at least as high as it is at the present time.

Crude and condensate production so far in 1948 has been about 10.8 per cent above production in the same period last year, and while the percentage gain may not be as high in the coming months because of high production in those months last year, we should end the year with about 10 per cent more crude and condensate than in 1947. If recoverable crude and condensate reserves are to be maintained at about 12.5 times production, the remaining reserves at the end of the year must be about 10 per cent above the level for the end of 1947. In other words, reserves must increase in proportion to production gains if we are to keep the same ratio. This would mean a net increase in crude and condensate reserves amounting to almost 2.4 billion barrels. If we add to this the expected 2.1 billion barrels to be removed from reservoirs during this year, we have a total of 4.5 billion barrels that the operators hope to find this year.

The exploratory drilling program for the last half of the year and the wildcats completed in the first 6 months add to more than 7,000 wells drilled in the search for new oil. This figure is important not only as an all-time record for wildcatting, but also as an indication of the increasing importance of development drilling in the over-all program. The wildcat wells drilled so far or planned for the remainder of the year represent over 18 per cent of the total drilling programed for the year, compared with a ratio of 16.5 per cent in 1947 and 15.4 per cent in 1946. It is worthy of note that the changes in the drilling program between the time of the annual issue in January and the mid-year issue in July included an increase of 15.6 per cent in wildcats over the original program, but an increase of only 8.6 per cent in field wells. From this it would seem that the trend toward wildcats is included even in the additions that have been made to the drilling schedules since the first of the year.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

ROCKY MOUNTAIN.—Two new pay zones were found during the past week: at Maudlin Gulch, Colorado, Texas-Frontier Oil Co. 2 Unit recovered oil on drill-stem test of the Sundance and is now running casing to complete the well; at Silver Tip, Park County, Wyoming, Seaboard Oil Co. recovered 4,000 ft. of oil on test of the Tensleep at its 37-28 Government, and is completing the well as a ½-mile extension in the Embar formation. Phillips Petroleum Co. made 120 ft. of oil on test of its South Cole Creek wildcat in Natrona County, Wyoming.

SOUTH LOUISIANA.—Magnolia Petroleum Co. opened a new gas field off the Terrebonne Parish coast out in the Gulf of Mexico, when the company's 1 Ship Shoal Lease 766, Block 72, gaged almost 2,000,000 cu. ft. of gas per day on initial flow test. Production is from a 10-ft. interval at 7,266 ft. On open flow test, the well made 118,000,000 cu. ft. of gas daily.

PERMIAN BASIN.—A new Devonian lime discovery has been completed 7 miles north of the Union (Clear Fork) pool in southwestern Gaines County. The Texas Co. et al 1 Jenkins flowed 175 bbl. of oil per day from perforations at 9,100-35 ft., above the Ellenburger which proved unsuccessful.

SOUTHWEST TEXAS.—Magnolia Petroleum Co.'s 1 Duval Ranch pumped 68 bbl. of oil per day from the Cole sand to open the new "DCR 79" pool in Duval County. Continental Oil Co.'s Live Oak wildcat gaged 560,000 cu. ft. of gas. per day on open flow with gas-condensate ratio of 88,000. The well is approximately 1 mile northeast of the "Kittie Burns" pool opener, but failed to produce in the Kittie Burns sand.

CANADA.—Canadian Gulf-Pincher Creek 1, southwestern Alberta Province, continues testing after recovering 48.9°-gravity oil after acidizing. Continental-Leduc-Woodbend 3 has been completed as a commercial producer from the lower Cretaceous.

EASTERN TEXAS

Whelan Pool Output Planned by Placid Oil

DALLAS.—Placid Oil Co. will drill a 1-mile southwest outpost to the Whelan gas-distillate pool of western Harrison County. It is 1 Katherine Bosch, 660 ft. from the east line and 1,000 ft. from the north line of 93-acre tract in the Benjamin Parker Survey, 2.8 miles southwest of Harleton. Contract is 8,000 ft. The location was made after an extensive rechecking of the sector with seismograph. The pool produces from the Rodessa and the Travis Peak.

The Texas Co. 1 Hanks, William Allbright Survey, northeast outpost to the Blackfoot pool of northern Anderson County, was swabbing after treating Rodessa section with 3,000 gal. of acid from 9,034-52 ft. Sanders & Murchison 1 Du Puy, Wm. Ashmore Survey, wildcat ⅞ mile northwest of Avant, was drilling below 9,094 ft.

Humble Oil & Refining Co. 1 Everett Winters, Wm. Price Survey, 1¼ miles northeast of Hackett, Smith County, was attempting to loosen drill pipe which stuck off bottom. Total depth is 9,352 ft., believed to be in the Rodessa. Humble 1 Sackett, V. Tejeda Survey, Travis Peak sand wildcat 4 miles north of Bullard in southern Smith, was bottomed at 10,600 ft. while surface casing was being recemented. Delta Drilling Co. 1 Max Rice, Oliver Sanderson Survey, wildcat 3½ miles southwest of Tyler, topped the Goodland at 7,405 ft. and was drilling below 7,425 ft.

Arkansas Fuel Co. 1 Adams, Graham Survey, near Garrison in Nacogdoches County, is coring past 6,141 ft. Operators cored lime with some show from 6,055-65 ft. and then drilled to 6,106 ft. A drill-stem test was run with seat at 6,048 ft., but only mud was recovered as tool plugged. First core below 6,106 ft. got hard, nonporous lime with no show.

Union Producing Co. 1 Dr. J. M. Travis, Thos. Quevedo Survey, 3 miles southeast of Mt. Selman, Cherokee County, was drilling below 6,432 ft. lime and shale. Hager Leese, Ashcroft and Delta 1 H. W. Wilson, Alex O. Wetmore Survey, wildcat 2¼ miles south of Sulphur Bluff, was drilling below 8,852 t. B. F. Phillips, Jr. 1 Mary E. Shearer, Polly Tier Survey, 8 miles southeast of Winnsboro, topped the Paluxy at 6,440 ft. and was drilling below 6,555 ft.

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SOUTH LOUISIANA

Magnolia Discovers Gas Field Off Louisiana Coast

NEW ORLEANS.—A new gas-field discovery out in the Gulf of Mexico off the Louisiana Coast in Terrebonne Parish has been completed by Magnolia Petroleum Co. The 1 Ship Shoal Lease 766, Block 72, is 8 miles south of Coon Point field. Salt was topped at 8,290 ft., with total depth in salt at 9,355 ft. On initial flow test the well gaged 1,992,000 cu. ft. of gas per day through a 12/64-in. choke, with flowing pressure on tubing 2,950 psi. Open flow test was 118,000,000 cu. ft. of gas daily. Production is through perforations at 7,266-7,276 ft. The well now is shut in.

Humble Oil & Refining Co. 1 State Lease 799, Caminada Pass Account 4, prospective discovery in the Gulf of Mexico, in Jefferson Parish, is testing through perforations at 4,436-56 ft. Total depth is 5,674 ft. in salt, with top of salt at 4,674 ft.

The Texas Co. is preparing to abandon operations in the 4 State-Barataria lease in Barataria Bay, Queen Bess Island area, Jefferson Parish, at a total depth of 16,106 ft. Tests were made from the bottom of the hole up to 15,000 ft., but all proved nonproductive.

Sun Oil Co. 1 Lyric Realty & Parking Co., oil discovery in Lafourche Parish, 1½ miles northeast of Chacahoula field production, has made an initial 24-hour gage. It flowed 166 bbl. of 34.6°-gravity oil daily through a ⅛-in. choke, flowing pressure on tubing 1,250 psi. Gas-oil ratio 568, showing 0.1 per cent water while cleaning. Total depth is 11,131 ft., and is located in Section 66-15s-15e.

The California Co. 1 State Lease 1278, wildcat oil discovery in the Main Pass Area of Plaquemines Parish, flowed an official gage of 216 bbl. of oil per day, 26.2°-gravity, through a 5/32-in. choke. Flowing pressure on tubing 670 psi., and gas-oil ratio 215. This test is 6 miles east of Delta Duck field and 15 miles southeast of Barnsdall et al Breton Sound gas discovery. Total depth 9,254 ft., with top of pay at 5,848 ft. Production is through perforations at 5,848-5,857 ft.

The Texas Co. 11 State-Rabbit Island, Lease 340, in Iberia Parish, has been temporarily abandoned due to high pressure, of 8,150 psi. A 15,000-lb. christmas tree has been set on the test and hole filled with heavy mud. Total depth is 12,656 ft., with 9⅝-in. casing at 11,462 ft., and 5-in. liner to 12,656 ft. On a ¼-in. choke the well flowed 10,300,000 cu. ft. of gas daily with flowing pressure on the tubing at 7,000 psi., through perforations at 12,436-446 ft.

One wildcat start was reported in Terrebonne Parish and 10 field locations were reported. Two successful exploratory tests were completed, one each in Avoyelles and Plaquemines parishes; two were dry, 1 each in Acadia and Lafayette parishes.

SOUTH LOUISIANA SUCCESSFUL WILDCATS

Avoyelles Parish: New oil pool, Marksville—Hunt Oil Co. 1 Harry H. Edwards, 78-2n-4e, 3½ mi. N of Marksville townsite, TD 9,117 ft., top sand 7,910 ft. (Wilcox),

perf. 7,926-32 ft., IP: 180 bbl. oil per day through a ½-in. choke, GOR 1,060, no water, TP 1,450 psi., CP 1,700 psi., gravity 48.1°.

Plaquemines Parish: New oil pool, Block 69 (Main Pass)—The California Co. 1 State Lease 1278, in Block 69, Tr. 2767, North Pass area of Gulf of Mexico, 6 mi. E of Delta Duck field production, and 15 mi. SE of Barnsdall et al Breton Sound gas discovery, TD 9,254 ft., top sand 5,848 ft., perf. 5,858-57 ft., IP: 216 bbl. oil per day through a 5/32-in. choke, GOR 215, TP 670 psi., gravity 26.2°, no water.

SOUTH LOUISIANA WILDCAT FAILURES

Acadia Parish: Sun Oil Co. 1 Lapleau Estate, in Midland area, 49-10s-2w, dry, TD 10,612 ft.

Lafayette Parish: Sohio Pet. Co. 1 Liquidators, Inc., 18-10s-3e, 2 mi. SW of Duson field discovery, dry, TD 12,442 ft.

APPALACHIAN FIELD

Carnegie Natural Brings In Shallow Gas Well

PITTSBURGH.—In southwest Pennsylvania, Manufacturers Light & Heat Co., No. 8 Barton Estate in Georges Township, Fayette County, is drilling at 9,594 ft., or 2,291 ft. below the top of the Oriskany sand, and Orville Eberly et al No. 1 John Dulick is drilling at 5,900 ft. In Shade Township, Somerset County, Peoples Natural Gas Co. is drilling at 8,766 ft. in No. 1 R. F. Grove, and in Derry Township, Westmoreland County, at 6,245 ft. in No. 4 Camilla Giffin. This same company has commenced drilling operations at No. 1 Piper in Unity Township, Westmoreland County.

A good shallow sand gas well was brought in by Carnegie Natural Gas Co. in the Murphy sand testing 520,000 cu. ft. of gas in No. 2 Wm. Longstreth, Amwell Township, Washington County, total depth 818 ft.

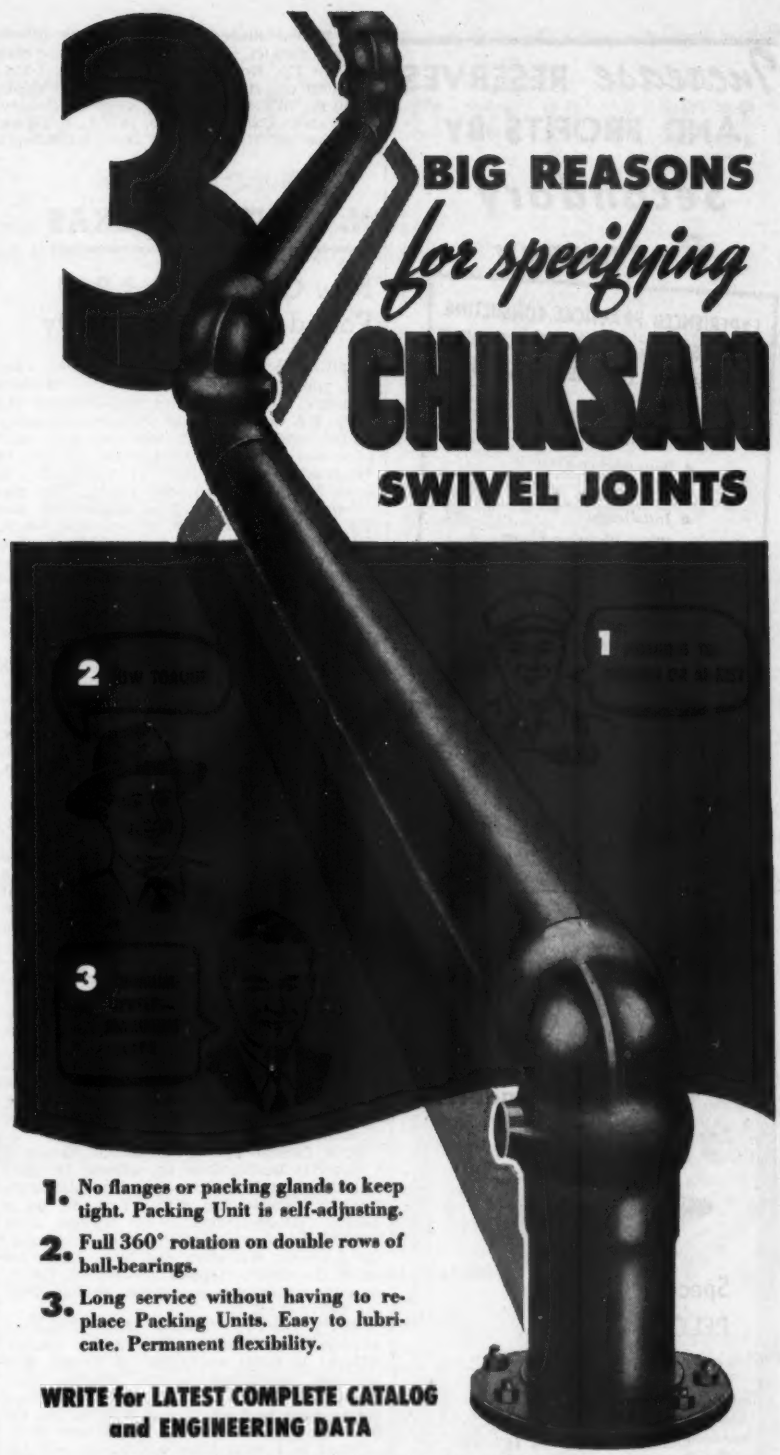
Seven new locations were reported: one each in Boggs and Wayne townships, Armstrong County; one in Red Bank Township, Clarion County; two in Conemaugh Township, Indiana County; one in North Strabane Township, Washington County; one in Washington Township, Westmoreland County.

In West Virginia, Godfrey L. Cabot, Inc., No. 1245 Eliz. P. Dunlap, elevation 581 ft., in Springfield District, Monroe County, will be abandoned after a long fishing job. This well reached a depth of 6,344 ft. In Pocatalico district, this company topped the Corniferous lime at 4,890 ft. in No. 1260 J. L. McLean Heirs, surface elevation 902 ft.

Hope Natural Gas Co. has announced that in Grant district, Jackson County, it will drill to the Clinton sand No. 9230 Lee Batten, elevation 851 ft. The Oriskany sand was reached at 4,867 ft. with a show of gas. This well is in the Waterbury gas pool in which so far there are two successful and four unsuccessful Oriskany sand wildcat operations. In this same area, but in Tucker district, Wirt County, United Fuel Gas Co. No. 6335 I. T. Thompson, elevation 1,001 ft., is drilling at 5,188 ft., having topped the Corniferous lime at 5,173 ft.

Oil wells reported in the Silverton Berea sand pool in Ravenswood district, Jackson County, were completed by Elsworth Jordan No. 3 W. W. Moore for 5 bbl., total depth 2,115 ft.; W. H. Price and G. H. Sample No. 1 U. B. Church for 40 bbl., total depth 2,157 ft.; Poffenberger and Good No. 1 Burhl W. Pepper for 50 bbl., total depth 2,142 ft., and No. 1 J. L. McMurray for 50 bbl., total depth 2,121 ft.

Good gas wells reported were in Cabin Creek district, Kanawha County, United Fuel Gas Co. No. 6312 David Ward, 1,485,000 cu. ft. from Maxon sand, total depth 1,883 ft.; in Harts Creek district, Lincoln County, United Fuel Gas Co. No. 6349 Fee, 2,843,000 cu. ft. from salt, and Berea sands



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and brown shale, total depth 3,442 ft.; in Logan district, Logan County, Columbian Carbon Co. No. 61 Island Creek Coal Co., 7,400,000 cu. ft. from Big lime, total depth 1,960 ft.; in Grant district, Nicholas County, Columbian Carbon Co. No. 1074 L. S. Grose, 4,029,000 cu. ft. from Big lime, total depth 2,628 ft.

N. CENTRAL TEXAS

New Canyon Sand Pool Found in Wichita County

WICHITA FALLS.—Opening a new Canyon sand pool in southern Wichita County, W. H. Hammon and Warren Oil Corp. 2-A Cole, Block 10, Palo Pinto County school lands, flowed 27 bbl. the first hour of a test. The well then made 613 bbl. of 44°-gravity oil the next 11 hours. Pay is from 2,952-63 ft., the total depth. The discovery is 3 miles south of Iowa Park and 933 ft. east of 1-A Cole, in the same block, first producer in the area which opened oil production from the KMA sand of the Strawn. It is reported this well also will be plugged back to test the Canyon sand. Other production from the Canyon is about 6½ miles south in the Holliday field of Archer County at about 2,460 ft.

Consolidated Oil Co. 3 Alice Daves, Block 14, League 2, Denton County school lands, Caddo discovery 2 miles south of Taylor Corner, was completed, flowing 175.12 bbl. of 43°-gravity oil in 4 hours on official test. Production is from 5,184-98 ft. Rig is being moved in for 1 Sisk Est., a 5,500-ft. test, 660 ft. south of the producer.

Standard-Fryer Drilling Co. et al 1 Morris, W. Bohn Survey, 1 mile southwest outpost to the Chico field in Wise County, topped the conglomerate at 5,050 ft. and drilled to 5,163 ft. A drill-stem test was run and recovery was 15 ft. of oil and gas-cut mud in a 2-hour period. A later test from 5,163-79 ft. showed gas at the surface in one minute, flowing gas through ½-in. choke. Recovery was 30 ft. of slightly gas-cut mud, with bottom-hole pressure of 1,500 lb. in 15 minutes. Circulation was lost in drilling to 5,206 ft. and another drill-stem test is planned. A new wildcat for Wise County is Moran Brothers 1 T. L. Craft, 660 ft. from the south and east lines of the T. L. Craft 72½ acres in the Ritchie Survey, 4 miles northwest of production in the Chico pool. It is 1¼ miles northeast of Crafton.

R. S. LeSage 1 Will McKeichan, Block 4, Comanche Indian Reserve, wildcat 13 miles southwest of Throckmorton, Throckmorton County, yielded 220 ft. of free oil on a 1-hour drill-stem test of the Strawn from 3,310-25 ft. after showing gas in 3 minutes. On a 1-hour drill-stem test from 4,140-4,154 ft. in the Caddo, topped at 4,140 ft., 220 ft. of oil-cut mud was recovered. It was drilling below 4,445 ft.

The Texas Co. 1 Fannie Merritt, Section 44, Block 13, T&P Survey, Jones County wildcat 14 miles southwest of Anson, will try for completion in the Strawn after finding the Ellenburger barren. The well was drilled to 5,408 ft. and test in the Ellenburger showed 100 ft. of gas and 30 ft. of mud in 1 hour from 5,367-75 ft. and 140 ft. of mud and 320 ft. of salt water from 5,390-5,408 ft. Casing was to be set through the Strawn with testing probably from 4,640-52 ft., where a drill-stem test showed possible production.

Opening of production from the Palo Pinto sand was indicated at Carl Robinson 1 J. H. Scott, Section 14, OAL Survey, wildcat 2 miles northeast of Anson. It was reported the well showed 300 ft. of oil on a drill-stem test slightly above 3,600 ft.

Fresno Oil Co. was drilling plug for a completion attempt on a prospective Cook sand discovery, 1 J. M. Morrisett, Section 67, Block 14, T&P Survey, 6 miles northwest of Clyde, Callahan County. A heavy show of gas was logged from 1,696-1,709 ft. and a show of oil from 1,709-14 ft. The gas was gaged at 3,800,000 cu. ft. daily. Previous production in this section has been from the Tannehill and Bluff Creek sands.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) SUCCESSFUL WILDCATS

Eastland County: Vim M. Gamblin 2 Jim Donaway, Sec. 3, Blk. 2, BBB&CRR Sur., 1¾ mi. S. Dotham, pumped 5 bbl. a day, pay 356-68 ft., TD 368 ft.

Lone Star Prod. Co. 2 C. J. Kleiner "A," Sec. 81, Blk. 4, H&TC Sur., 2 mi. N Cisco, flowed 118 bbl. 43°-gravity oil a day, pay 3,869-907 ft. and 3,919-27 ft., TD 3,986 ft.

Jones County: Sellers & Brown 1 W. D. Minter, Sec. 11, Blk. 15, T&P Sur., 3 mi. N Hawley, flowed 880 bbl. 38°-gravity oil 6 hrs., pay 2,025-32 ft., TD 2,032 ft.

Shackelford County: F. W. Peckham 1 L. A. Sanders, Sec. 21, Blk. 11, T&P Sur., 2 mi. NE Albany, pumped 2 bbl. 38°-gravity oil day, TD 600 ft.

Stephens County: Bailey Griffin et al 1 McClelland "B," Sec. 463, SPRR Sur., SW corner of county, pumped 12 bbl. 45°-gravity oil a day, pay 3,599-3,612 ft., TD 3,968 ft.

Wichita County: W. H. Hammon and Warren Oil Corp. 2-A T. J. Cole, Blk. 10, Palo Pinto CSL Sur., 6 mi. N Holliday, flowed 1,485 bbl. 44°-gravity oil a day, pay 2,952-63 ft., TD 2,963 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) WILDCAT FAILURES

Archer County: Consolidated Oil Co. and Baird Refg. Co. 2-B J. L. Prideaux, SA&MG Sur. 8 mi. SW Windthorst, Lipscomb 2,373 ft., dry, TD 3,075 ft.

G. F. LeBus, Jr. 1-A Anna Mangold, Blk. 27, P. Castleman Sur., dry, TD 4,158 ft.

J. J. Lynn 1 L. F. Wilson Prop., Blk. 48, ATNCL Sur., 10 mi. S Wichita Falls, dry in Ellenburger, TD 5,706 ft.

Palo Pinto Oil & Gas Co. et al 1 J. R. Parkey et al, Blk. 35, Dallas CSL Sur., 16 mi. W Archer City, dry, TD 1,651 ft.

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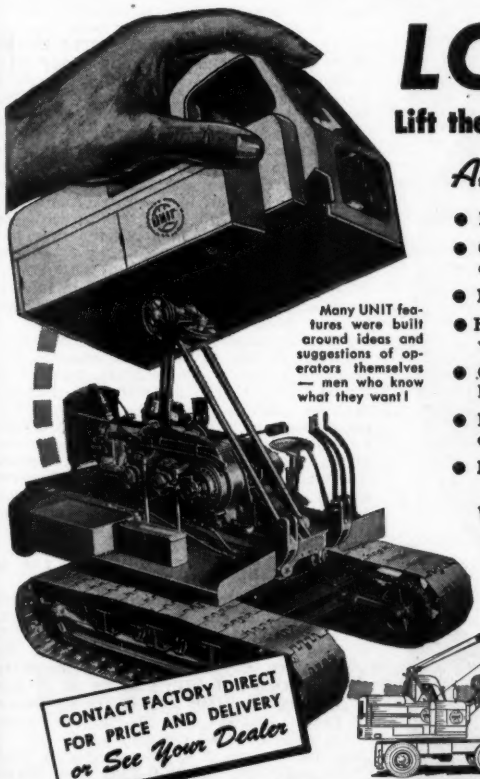

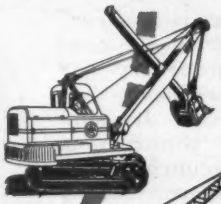

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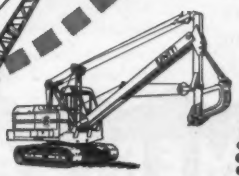

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Callahan County: Ungren & Frazier et al 1 C. B. Young, Sec. 20, BBB&CRR Sur., 6 mi. SW Clyde, dry, TD 2,045 ft.

Clay County: Bridwell Oil Co. 22 Edrington Est., Blk. 35, HT&B Sur., 8 mi. W Petrolia, dry, TD 1,392 ft.

Comanche County: W. L. Douthit 1 R. M. Boyd, James Hudson Sur., dry, TD 2,873 ft.

Cooke County: The Atlantic Refg. Co. 2 John Rivoire, B. C. Bagby Sur., 5½ mi. SE Marysville, Ellenburger 3,995 ft., dry, TD 4,139 ft.

W. O. Russell et al 1 J. W. Harris, SPRR Sur. A-1000 2 mi. W Hood, Ellenburger 1,618 ft., dry, TD 1,690 ft.

Fred Snuggs 1 D. J. Dresser, Blk. 14, Hiram Sakler Sur., A-901, 10 mi. NW Gainesville, Ellenburger 4,209 ft., dry, TD 4,298 ft.

Jack County: John T. Nunnelee et al 1 J. A. Burt, J. Anders Sur. A-15, 9 mi. SE Antelope, dry, TD 392 ft.

F. B. Drlg. Co. 1 Elbert Moore, Sec. 1, BBB&CRR Sur., 8 mi. S Antelope, dry, TD 543 ft.

Jones County: G. H. Brodie 1 Hallis Madden, Lot 1, Goliad CSL Sur. No. 359, 2 mi. SE Nienda, Gunsite 3,105 ft., King 3,220 ft. dry, TD 3,300 ft.

Geochemical Surveys 1 A. B. Cranston, Sec. 11, Blk. 17, T&P Sur., 6½ mi. W Hawldy, dry, TD 2,612 ft.

Shackelford County: Phillips Pet. Co. 1 Rea, L A L Sur. A-967, 2 mi. NW Sedwick, Ellenburger 4,241 ft., dry, TD 4,261 ft.

Stephens County: Texas Pacific Coal & Oil Co. 1 J. R. Hill, Sec. 12, Blk. 2, SPRR Sur., 2½ mi. SE Eliasville, Barnett 4,359 ft., Mississippian 4,432 ft., Ellenburger 4,555 ft., dry, TD 4,563 ft.

Young County: Goodstein & Gordon 2 J. M. Golden, Blk. 25, Young CSL Sur., 2 mi. N Murray, dry, TD 2,649 ft.

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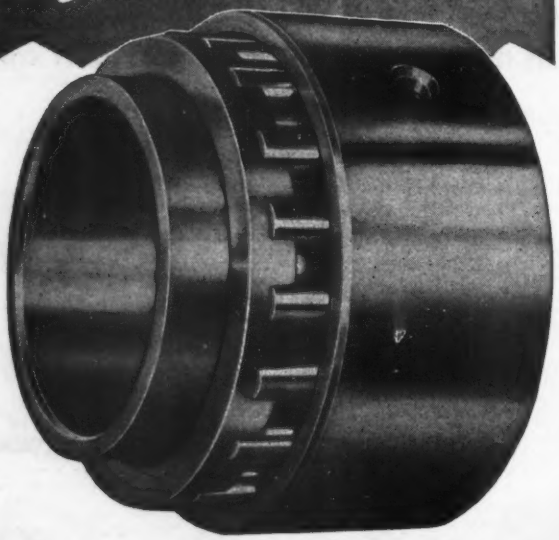

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Baylor County: S. F. Hutcheson 1 H. W. Brown, Sec. 49, Blk. 45, H&TC Sur., 3 mi. S Bomarton, dry, TD 1,484 ft.

Stonewall County: Humble 1 Dearcy Smith et al, Sec. 136, Blk. D, H&TC Sur., 4 mi. N Aspermont, dry, TD 5,432 ft.

TEXAS GULF COAST

Stanolind Gets Gasser in Clinton Field Deep Sand

HOUSTON.—A new deep sand in the Clinton field of Harris County has been opened by Stanolind Oil & Gas Co. 2 A. S. Moody, located in the Reels and Trobough Survey on the northeast side of oil production in the gas producing area. Drilled to a total depth of 10,001 ft., sand was topped at 8,000 ft., and through an 8/64-in. choke the well flowed 1,519,000 cu. ft. of gas daily with flowing pressure at 4,563 psi. Open flow estimated to be 11,500,000 cu. ft. of gas daily. Production is through perforations at 8,000-48 ft.

Lloyd H. Smith & McKay Donkin 1 J. C. Allen, potential oil discovery, 1½ miles west of Withers production in Wharton County, has made an initial test, which resulted in an oil flow. Total depth is 7,306 ft., and pipe was perforated from 7,187-7,191 ft. and a drill-stem test was made using a ¼-in. bottom and 6/64-in. top choke with 2,000-ft. water cushion. The test came in blowing gas and mud, then started making oil with slugs of mud. Pressure worked up to 1,025 psi. and flowed oil and mud for approximately 2 hours, then salt water started appearing. Operators are preparing to squeeze off the perforations and make a test in the same section. This well is located in the Mark Weiss Survey, Section 22.

Humble Oil & Refining Co. 1 Lelia W. Rearwin et al, a ½-mile southwest extension to the southwest discovery area of the Anahuac field in Chambers County, has reported official gage of 219.5 bbl. of 54.8° gravity condensate daily along with 7,200,000 cu. ft. of gas daily. Total depth is 8,918 ft. and perforations are from 8,814-842 ft.

A new gas-condensate producer for the east extension area of the Old Ocean field in Brazoria County has been completed at J. S. Abercrombie and Magnolia Pet. Co. 1 Anna A. Warner, in the S. F. Austin 7½ League. Total depth is 11,289 ft., with top of pay at 11,150 ft. On a 24-hour flow test the well gaged 119.32 bbl. of 49.8°-gravity condensate per day along with 4,533,000 cu. ft. of gas daily through a 12/64-in. choke. Flowing pressure on tubing was 2,250 psi. Shut-in pressure 3,987 psi. Production is through perforations at 11,185-11,190 ft.

Eleven of the 51 locations reported for Districts 2 and 3 were wildcat starts, 2 in Wharton and 1 each in DeWitt, Fort Bend, Jackson, Jefferson, Karnes, Orange, Refugio, San Jacinto and Victoria counties. Four successful exploratory tests were completed, 1 each in Harris, Live Oak, Orange and Victoria counties. Seven wildcats were dry, 1 each in Bee, Fort Bend, Jackson, Jefferson, Lee, San Jacinto and Victoria counties.

TEXAS GULF COAST (DISTRICTS 2 & 3)
SUCCESSFUL WILDCATS

Harris County: New gas sand Clinton field —Stanolind Oil & Gas Co. 2 A. S. Moody, Reels & Trobough Sur., on NE side of oil production in gas area, TD 10,001 ft., top sand (Cockfield) 8,000 ft., perf. 8,000-48 ft., IP: 1,519,000 cu. ft. gas per day through 8/64-in. choke, open flow 11,500,000 cu. ft. TP 4,563 psi., shut-in pressure 4,890 psi. Dry gas.

Live Oak County: New gas-condensate pool —Continental Oil Co. 1 Clay West Burns Christenson, in Willis S. Novell Sur. 58, 5½ mi. SW of Geo. West and 4,950 ft. NE of discovery well at "Kittie Burns" field, top pay 7,170 ft., TD 10,313 ft.,

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perf. 7,170-84 ft., IP: 560,000 cu. ft. gas per day on open flow, gas-condensate ratio 88,000, shut-in pressure 1,300 psi., gravity 55°-condensate, no water. No gage on condensate.

Orange County: New sand and extension North Port Neches—Gulf Oil Corp. 1 W. W. Kyle Sr., in Wm. Allen Sur. A-28, TD 10,628 ft., top sand 8,980 ft., perf. 8,980-90 ft., shut-in, no gage, TP 4,900 psi., CP 5,200 psi., 52°-gravity condensate, no water.

Victoria County: New gas pool—Taylor Refg. Co. 1 Meta Hanselmann, Block 102, Allison-Richey Ld. Co. subd., Charles Grenor Sur., A-173, 1½ mi. NW of Marcado Creek gas field and 2½ mi. SW of Telferner, top pay 4,678 ft., original total depth 5,670 ft., TD in sidetracked hole 4,743 ft. perf. 4,678-84 ft., IP: gas well, no gage, TP 1,875 psi., on ¼-in. ch., CP 1,900 psi., no water. Comp. 6-25-48.

TEXAS GULF COAST (DISTRICTS 2 & 3) WILDCAT FAILURES

Bee County: I. Rudman 1 W. J. Lytle et al, in Day Cryer Sur., 5 mi. S of Mineral and ⅝ mi. W of discovery of Holzmark-Wilcox field, dry, TD 8,478 ft.

Fort Bend County: Houston Oil Co. of Texas 1 Mozelle Avery et al, West Clodine area, in Jas. Knight & W. G. White Sur., dry, TD 7,564 ft.

Jackson County: Starr Oil Co. 1 E. T. Rose et al, Valentin Garcia Gr., 5 mi. NW of Vanderbilt, dry, TD 6,514 ft.

Jefferson County: Meredith, Clegg & Hunt 1 Broussard Trust, in Gilbert Ranch area, in J. C. Lawhon Sur., 2½ mi. E of Gilbert Ranch prodn., dry, TD 9,039 ft.

Lee County: Humble O. & R. Co. 1 First National Bank of Dallas, Tanglewood area, in John Chenoweth Sur., 3 mi. SE of Tanglewood townsite, dry, TD 6,407 ft.

San Jacinto County: H. L. Hunt 1 Charlie Sweet, in Jose Maria de La Garza Sur. A-18, 12 mi. SW of Cold Spring townsite, dry, TD 8,010 ft.

Victoria County: Hunt Oil Co. 1 Mrs. Lillie Wurdell et al, in Samuel Shupe Surveys, A-302 and A-303, 7 mi. W of Victoria, dry, TD 4,615 ft.

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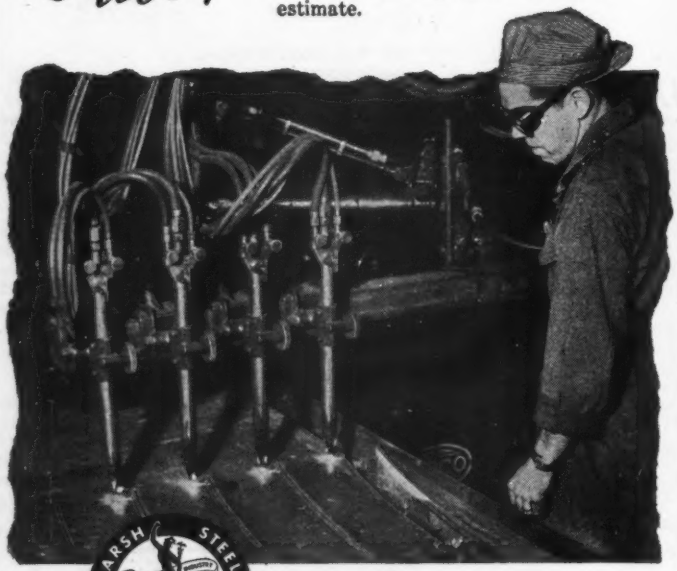

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MISSISSIPPI

Gwinville Field Gets Two Gas-Well Completions

JACKSON.—Two gas wells were completed in Gwinville field of Jeff Davis County by Humble Oil & Refining Co. The 46 Gwinville Gas Unit, 31-9n-18w, flowed at the rate of 7,941,000 cu. ft. per day through an 11/32-in. choke, tubing pressure 2,800 psi. with no gage on condensate. Total depth 8,190 ft., with production through perforations at 8,157-80 ft. The 1 J. W. Madden, Jr., et al (Gas Unit 42), 1-8n-19w, was drilled to total depth of 8,125 ft., and flowed at the rate of 7,978,000 cu. ft. gas per day through an 11/32-in. choke, tubing pressure 2,800 psi., with no gage on condensate. Perforations are from 8,067-90 ft.

Testing of the possible new Sparta producing horizon in Kemp-Gilster-Hodge-Vaughey 3 V. T. Craig Estate, La Grange field, Adams County, has been delayed due to difficulties in getting a satisfactory squeeze job. It was necessary to squeeze the third time before pressure could be built up above 2,500 psi. Operators used 725 sacks of cement in the three stages.

Drilling activity at La Grange field has declined until only 5 rigs are operating and only 2 locations waiting on rigs.

Kirby Petroleum Co. A-6 Long Bell Petroleum Co., 25-1n-17e, in Langsdale field, Clarke County, has been completed on the pump for 68 bbl. per day of 18.8°-gravity oil. Total depth 3,819 ft.

In Mallalieu field, Lincoln County, Humble B-2 Edward Grenn, et al, 18-6n-8e, flowed 414 bbl. of 38.6°-gravity oil per day through a ⅜-in. choke, through perforations at 10,440-65 ft. Total depth 10,480 ft.

Phillips Petroleum Co. 1 Washington, 47-8n-2w, in Pine Ridge field, Adams County, was drilled to total depth of 5,680 ft., perforated 5,589-94 ft., and flowed on potential test 153 bbl. of 40°-gravity oil, through a ⅛-in. choke, tubing pressure 585 psi.

Humble's B-8 G. M. & O. Land Co., 14-9n-8w, in Yellow Creek field, Wayne County, pumped 198 bbl. of 19.8°-gravity oil plus 20 per cent water.

Three wildcat starts were reported this week, 1 each in Harrison, Marion and Sharkey counties. Seven field locations are 2 each in Brookhaven and Cranfield fields and 1 each in Baxterville, Mallalieu and Sandy Hook fields.

MISSISSIPPI WILDCAT FAILURES

Adams County: Big Chief Drilling Co. 1 Mrs. Josie B. Lambdin, 38-8n-2w, dry, TD 7,210 ft. Top Wilcox 3,854 ft., Top Artman sand 5,534 ft., Baker sand 5,785 ft.

Adams County: Roy L. Fisher 1 Shields, 40-8n-2w, dry, TD 5,956 ft.

Jefferson County: Union Oil of California 1 J. S. Wagner, 49-10n-1w, dry, TD 9,810 ft. Tops: Marine Tuscaloosa 9,370 ft., Lower Tuscaloosa 9,539 ft.

Lamar County: Union Producing Co. 1 E. H. Bradshaw, et al, 19-3n-16w, dry, TD 10,663 ft. Tops: Tuscaloosa 8,167 ft., Marine Tuscaloosa 8,750 ft., Lower Tuscaloosa 9,110 ft., Lower Cretaceous 9,660 ft., Washita-Fredericburg 10,654 ft. (questionable).

ALABAMA WILDCAT FAILURES

Choctaw County: Lutz Johnson 1 Emmett

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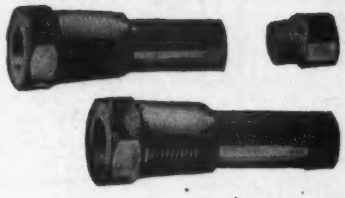

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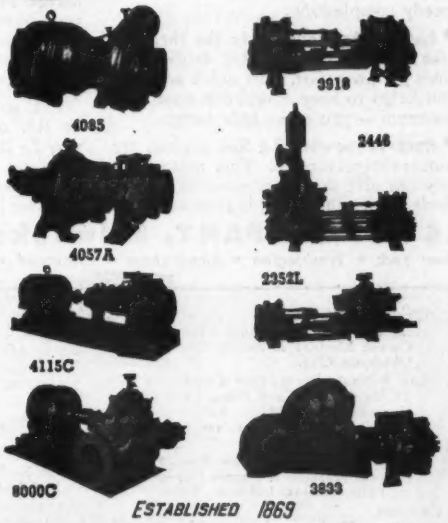

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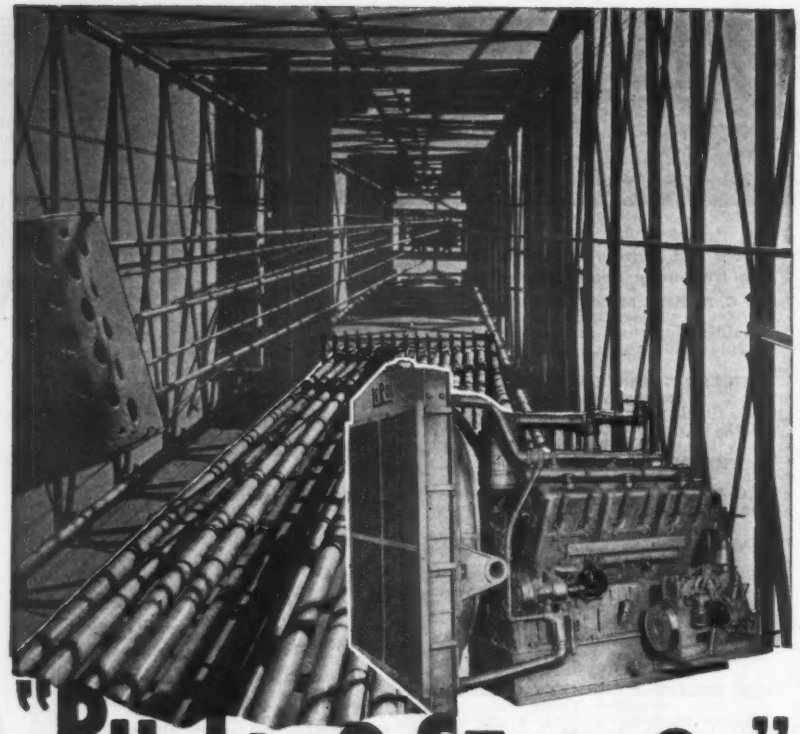

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West, Center NE SE 32-13n-3w, dry, TD 3,235 ft.

Washington County: Humble Oil & Refg. Co. 1 Washington Lbr. & Turpentine Corp., Sec. 29-3n-1e, dry, TD 540 ft. in salt.

GEORGIA WILDCAT FAILURE

Colquitt County: R. T. Adams 1 D. G. Arrington, in Land Lot 270 of 8th Land District, dry, TD 4,910 ft.

KANSAS

Rice County Wildcat Has Big Show of Oil

SKELLY OIL CO. had a good oil show at 1 Gemeinhardt, NW NW SE 18-18s-10w, Rice County wildcat. The Arbuckle was called at 3,293 ft. and a 20-minute drill-stem test at 3,286-97 ft. recovered 1,060 ft. of oil, estimated at 40° gravity. Casing has been set on top of the Arbuckle. The well is located about 2 miles southwest of Heinz pool and about the same distance northwest of West Orth pool.

J. P. Gaty 1 Brown, NE NW NE 30-26s-2e, Sedgwick County, has been drilled to a total depth of 2,961 ft. and had a fillup of 1,600 ft. of oil in 20 minutes from the Basal Pennsylvanian which was topped at 2,957 ft. Casing has been run to 2,947 ft. The well is located 2½ miles west of Greenwich pool and is a part of an active drilling program by Gaty in the county. Gaty 1 Broers, CNL SE SW 5-26s-2e, has been completed for a pumping potential of 776 bbl. per day from the same formation.

Drillers Gas Co. and R. C. Patton have set casing for tests at 1 Wingate, SW SW SW 7-31s-8w, a rank Harper County wildcat. The following tops have been reported: Topeka, 2,940 ft.; Lansing, 3,635 ft.; Mississippi, 4,385 ft.; Kinderhook, 4,556 ft.; Viola, 4,726 ft.; Simpson, 4,776 ft.; and Arbuckle, 4,907 ft. A 1-hour drill-stem test of the Mississippian at 4,385-4,403 ft. had a flow of 1,500,000 cu. ft. of gas and recovered 60 ft. of mud and oil. Another drill-stem test at 4,408-4,511 ft., with tool open for 30 minutes, recovered 800 ft. of gas-cut mud and 400 ft. of oil-cut mud. Porosity was noted in the Viola so casing has been set to 4,817 ft. even though no shows were reported for this formation.

Roberts & Murphy and Rine Drilling Co. have a good Simpson well at 1 Earlwine, NW SW SW 36-29s-14w, on the south border of Pratt County. The Simpson was called at 4,456 ft. and casing was set 1 ft. in the Arbuckle at 4,539 ft. Perforations were made at 4,494-98 ft. and oil rose 3,500 ft. in the hole in 1 hour. Oil flowed in 1 hour and 40 minutes and on last report was flowing at the rate of 12 bbl. per hour.

In Barton County, Alpine Oil & Royalty Co. 1 Bryant, NW SW NE 27-20s-12w, swabbed 3 bbl. of oil per huor for 12 hours from the Arbuckle which was topped at 3,383 ft. Total depth is 3,401 ft.

Included in the total of 54 new locations for the week were 7 new spots each for Barton and Rooks counties. Ellis County accounted for six and Russell for five of the remaining locations.

KANSAS SUCCESSFUL WILDCAT

Russell County: New pay, Hall Gurney—Stearns et al 5 Opdycke, NW SE SW 20-14s-13w, IP 15 bbl., TD 2,025 ft.

KANSAS WILDCAT FAILURES

Butler County: Hagerl 1 Metzger, SE NW NW 19-28s-3e, dry, TD 3,143 ft., Arbuckle 3,141 ft.

Cowley County: Aladdin et al 1 Brandenberg, SE SE NE 3-35s-3e, dry, TD 3,510 ft., Mississippi lime 3,458 ft.

Harvey County: Hager 1 Steinkirchner, SE NE SE 18-24s-1e, dry, TD 3,520 ft., Arbuckle 3,496 ft.

McPherson County: Ingling et al 1 Serviss, SW SW NE 22-18s-1w, dry, TD 3,355 ft., Kinderhook 3,070 ft., Hunton 3,223 ft., Sylvan 3,229 ft., Viola 3,326 ft.

Pratt County: Lion 1 Schrepel, NW NW SE 19-29s-14w, dry, TD 4,742 ft., conglomerate 4,538 ft., Viola 4,546 ft., Simpson shale 4,647 ft., Arbuckle 4,723 ft.

Reno County: Bauer 1 Tonn, SW NE SW 15-25s-5w, dry, TD 4,103 ft., Lansing-Kansas City 2,795 ft., Mississippi lime 3,519 ft., Misener 3,890 ft., Sylvan 3,895 ft., Simpson 3,969 ft., Arbuckle 4,054 ft.

Rice County: Weaver 1 Hoescher, SE SE SE 2-19s-10w, dry, TD 3,300 ft., Lansing-Kansas City 2,937 ft., slight show of oil at 3,155-61 ft., cherty conglomerate 3,263 ft.

Rush County: Brack 1 Hoffman, NE NE SE 26-16s-16w, dry, TD 3,660 ft., Lansing-Kansas City 3,308-3,512 ft., conglomerate 3,552 ft., Arbuckle 3,576 ft.

El Dorado 1 Schaffer, SE SE NE 17-16s-17w, dry, TD 3,551 ft., Arbuckle 3,533 ft.

Sheridan County: Helmerich & Payne 1 Morgan, NE NE SW 2-9s-26w, dry, TD 4,510 ft., Mississippi lime 4,320 ft., Arbuckle 4,445 ft.

Stafford County: Lewis et al 1 Shartz, NE NE SW 34-21s-14w, dry, TD 3,890 ft., Heebner 3,317 ft., Lansing-Kansas City 3,449-3,713 ft., cherty conglomerate 3,722 ft., Viola 3,754 ft., Simpson sand 3,791 ft., Arbuckle 3,850 ft.

Palmer 1 Felke, NE NW NE 28-22s-12w, dry, TD 3,720 ft., Arbuckle 3,711 ft.

Sumner County: Anderson 1 Schneuman, SW SW NW 10-34s-1e, dry, TD 4,186 ft., Arbuckle 4,134 ft.

Wabaunsee County: Amerada 1 Mertz, SW SW NE 6-11s-10e, dry, TD 1,234 ft.

OKLAHOMA

Hughes County Gets Cromwell Sand Pool

NEAR the northern border of Hughes County, F. B. Murta has a new Cromwell sand pool at 1 Ida Ellis, SE NW SE 6-9n-11e. Well was drilled to 4,018 ft. in the Wilcox and casing set. Operator first perforated opposite the Hunton at 3,780-85 ft. but since the lime did not appear commercially productive, perforations were made opposite the Cromwell at 3,107-11 ft., resulting in production of gas estimated at 3,000,000 cu. ft. per day plus oil estimated at from 50 to 100 bbl. per day. The well is located about 2 miles north of production in East Wetumka pool.

Samedan Oil Corp. continues testing at the North Alma extension well, 1 Trotter, NW SE SE 9-1s-4w, Stephens County. Following tests of the Dornic Hills through perforations at 5,251-99 ft. where the production was about 3 bbl. per hour, operator with 210 holes at 5,125-60 ft. for flow of 4 bbl. per hour through 2-in. casing opening. The well later averaged 6 bbl. per hour through ¾-in. tubing choke.

Continental Oil Co. has a good show of oil at 1 Head, SE SE SE 6-4s-2w, Carter County wildcat. A 45-minute drill-stem test of the Hoxbar sand at 2,947-67 ft. had gas in 21 minutes and recovered 120 ft. of 38°-gravity oil, 90 ft. of muddy oil and 90 ft. of oil and gas-cut mud. The well also had a show of oil on drill-stem test at 2,762-95 ft.

Mid-Continent Oil Co. missed Gilcrease production at 1 McIntosh, SW NW SE 29-13n-10e, offset to the opener of the new pool, South Haydenville, but had a gas show in a formation reported as sandy Wapanuca. A drill-stem test at 3,040-65 ft. showed gas estimated at 100,000 cu. ft. per day and recovered 30 ft. of slightly gas-cut mud. Pipe has been set for further test of the formation.

Gulf Oil Corp. continues coring at 1 Mainka, NW NW NE 12-5n-5w, Grady County, where production would extend the Golden trend to the northwest from North Lindsay pool. Operator cored sand with stain and odor at 12,884-12,963 ft. and then cored at 12,984-96 ft. to recover 3½ ft. including 2 ft. with good stain and odor.

Tide Water Associated Oil Co. seems to have found the pay in the narrow strip between South Ceres and Southwest Ceres at 3 Haefner, SW NE SE 4-22n-1w, where operator cored over 40 ft. of sand. On cores taken at 4,579-4,622 ft., the recovery was mostly sand with good porosity and odor with fair to good saturation. Casing has been set for further tests.

OKLAHOMA SUCCESSFUL WILDCATS

Cotton County: Akin 1 Tselee, SW NW NE 12-2s-11w, pumped 25 bbl. of 34°-gravity oil per day from sand at 2,222-32 ft., TD 2,232 ft.

Garvin County: Anderson 1 Freeman, NW NE SE 26-3n-2w, pumped 30 bbl. of 43°-gravity oil in 6 hours from second Deese sand at 5,473-5,503 ft., TD 5,645 ft.

Lincoln County: Falcon 1 Yancey, SE SE NW 26-14n-3e, flowed 4,150,000 cu. ft. of gas from Prue at 4,110-12 ft., TD 4,124 ft.

Okfuskee County: Wilcox 2 Mackey, SW SW SE 24-12n-9e, flowed 100 bbl. of 38°-gravity oil per day from Cromwell at 3,214-30 ft., TD 3,258 ft.

Mid-Continent 1 Holderby, SE NE SW 29-13n-10e, flowed 130 bbl. of 31°-gravity oil per day from Cromwell at 2,910-26 ft., through ¼-in. tubing choke, TD 2,926 ft.

Payne County: Deardorf 1 Howell, SW NE SE 14-17n-3e, flowed 4,650,000 cu. ft. of gas per day from Red Fork at 3,900-26 ft., TD 3,978 ft.

Stephens County: Palmer 1 Leard-Amerada, SE NE NW 31-2n-5w, flowed 21 bbl. of 35°-gravity oil from sand at 10,039-78 ft., TD 10,144 ft.

OKLAHOMA WILDCAT FAILURES

Carter County: Wirt Franklin 1 Grisso, NW SE SE 31-4s-2w, dry, TD 4,362 ft., Hoxbar 1,065 ft., Simpson 4,325 ft.

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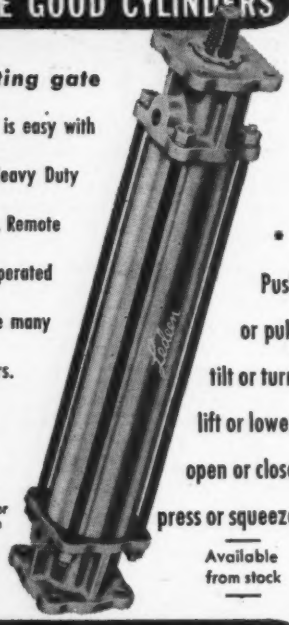

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Cotton County: Morgan 1 Pfeister, SE SE NE 17-4s-11w, dry, TD 2,004 ft., sands 1,489-1,507 ft., 1,756-59 ft. and 1,840-50 ft., no shows.

Lincoln County: Harper 1 Alba, NW NW SE 30-17n-4e, dry, TD 4,580 ft., no tops reported.

Okfuskee County: Goddard 1 Douglas, NE SE NE 5-10n-11e, dry, TD 3,058 ft., Cromwell 3,050 ft.

Wilcox 1 Campbell, NE NE NE 6-13n-7e, dry, TD 3,391 ft., Oswego 2,829 ft., Prue 2,837 ft., Skinner lime 3,017 ft., Skinner sand 3,030 ft., Inola 3,355 ft., Bartlesville 3,361 ft.

Pontotoc County: Phillips 1 Bagwell, NE NE SW 31-6n-4e, dry, TD 3,402 ft., Wanette 3,245 ft., lower Wanette 3,310 ft.

Seminole County: Elm Oil 1 Hennig, SW NE SE 26-9n-7e, dry, TD 3,569 ft., Senora sand 2,485 ft., Earlsboro 2,865 ft., upper Booch 3,325 ft., lower Booch 3,376 ft., Gilcrease 3,459 ft., Union Valley 3,546 ft., Cromwell 3,558 ft.

Bell 1 Uldrich, SE SE NE 31-11n-6e, dry, TD 4,750 ft., Earlsboro 3,565-3,643 ft., Sylvan 4,476 ft., Viola 4,572 ft., Wilcox 4,649-90 ft., second Wilcox 3,729 ft.

Stephens County: Gulf 1 Conn, NW NE NW 33-1n-5w, dry, TD 7,643 ft., no tops reported.

Carter 1 Williamson, C SE SE 36-2n-6w, dry, TD 9,513 ft., Hoxbar 2,705 ft., Deese 2,725 ft.

Tillman County: Mack Oil 1 McCaughey, SE NW NE 33-1s-17w, dry, TD 4,511 ft., Pontotoc 2,500 ft., Pennsylvanian 2,810 ft., Canyon 3,675-4,504 ft.

Woodward County: H. E. R. 1 Harrison, C SW NW 18-25n-19w, dry, TD 6,969 ft., Fort Riley 3,015 ft., Topeka 4,242 ft., Tonkawa lime 4,845 ft., Oswego 6,032 ft., lower Oswego 6,243 ft., Inola 6,694 ft., Bartlesville 6,728 ft.

LA.-ARK.

Wildcat Near Richland Field Finds Salt Water

SHREVEPORT. — California Oil Co. 2 Breece, 30-17n-5e, wildcat 6 miles west of abandoned Richland gas field of Ouachita Parish, bottomed at 9,454 ft. in Cotton Valley, flowed 8 bbl. fluid, 90 per cent salt water and 10 per cent of 49.2°-gravity distillate. The well was killed and acidized with 1,000 gal. and flowed 100 bbl. salt water through 5/8-in. choke. California 2 Maxey, 32-18n-1e, wildcat 5 miles southeast of the Tremont field, was repairing casing leak. Total depth is 9,577 ft.

Hunt Oil Co. 1 A. O. Goodwin, 21-23n-7w, 1 mile southeast of East Haynesville field, Claiborne Parish, was drilling below 9,103 ft. in Cotton Valley. Union Producing Co. 1 Mansfield Hardwood Lumber Co., 4-11n-11w, 7,500-ft. test on the south edge of Bull Bayou field, was drilling below 5,736 ft. in Lower Glen Rose. This is a "tight well."

M. A. Halsey et al 1 Bishop-Lewis Unit, 30-20n-6w, 10,000-ft. test in the Athens field of Claiborne Parish, topped the Cotton Valley at 8,000 ft. and was drilling below 8,062 ft. in hard shale. Delta Drilling Co. 1 J. T. Meadows, 1-22n-7w, 3½ miles southeast of Haynesville field, was drilling below 7,254 ft. in Travis Peak.

North American Oil Consolidated 1 J. Swinney, 5-17n-11w, deep test in Sligo field, Bossier Parish, was drilling below 7,052 ft. in Travis Peak. Phillips 1 C. Ellerbe, 17-15n-12w, deep test in old Caspiona gas field, Caddo Parish, another "tight well," was drilling below 3,730 ft.

Barnsdall 1 Robert Sykes, 1-22n-9w, 2 miles east of Shongaloo field, Webster Parish, was coring at 8,495 ft. in the Cotton Valley which was topped at 7,735 ft. Core from 8,231-74 ft. recovered 41 ft. of shale and hard gray sand with no show.

E. C. Laster et al 1 Perkins-McLaurin, 25-15n-14w, 6½ miles northeast of the Kickapoo field, DeSoto Parish, was drilling below 5,362 ft. in Lower Glenn Rose. Core from 5,118-24 ft. recovered 2 ft. lime with gas odor. Core from 5,124-89 ft. recovered shale and lime with no show. Drill-stem test from 5,075-5,189 ft., open 25 minutes, had a good blow at the start. Recovery was 20 ft. mud with no show.

In Arkansas, Carter Oil Co. 1 J. F. Ethredge, 20-19s-16w, Union County, 3 miles northwest of Junction City, Louisiana, was drilling below 7,118 ft. S. W. Richardson et al 1 Shell-Pratt, 36-19s-15w, 6 miles east of Junction City, was drilling below 6,585 ft. Stanolind 1 Bodcaw, 29-19s-23w, 11 miles south McKamie field, Lafayette County, was drilling below 8,814 ft. in shale and sand. Cotton Valley was topped at 7,990 ft. Stanolind 1 Union Saw Mill, 18-19s-24w, in the old Bradley field, topped the Sligo at 6,322 ft. and was drilling below 6,826 ft.

NORTH LOUISIANA WILDCAT FAILURES

Franklin Parish: J. A. Harper & Co. 1 G. E. Chapman, 17-16n-9e, 1½ mi. SE of SW Delhi field, Paluxy 4,282 ft., dry, TD 4,500 ft.

Winn Parish: H. L. Hunt & Nebo Oil Co., Inc., F-141 Nebo Oil Co., 28-10n-2w, dry, TD 7,360 ft.

ARKANSAS WILDCAT FAILURES

Cleveland County: DeSha Basin Corp. 1 E.

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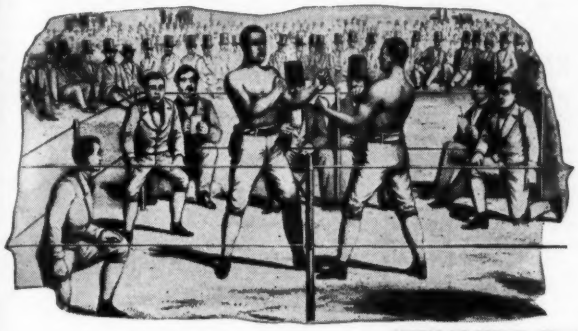

COURTESY THE BETTMANN ARCHIVE

EXACTLY what is there about Reo trucks that makes fleet owners, operators, drivers and mechanics go to bat for them at the buzz of a starter?

Is it Reo More-Load design? This exclusive Reo feature cuts inches off the wheelbase—gives a *full payload in a more compact unit.*

Perhaps it's the *ease of maneuverability* of a More-Load design Reo truck that makes users swell with pride—and profits.

Then again, Reo drivers might be chesty just from the sheer pleasure of handling a responsive, easy-to-steer Reo truck. Reo's close, tight, turning radius is made to order for tough city driving and any kind of highway hauling.

Better consider the twinkle in the mechanic's eye. Likely it's a gleam of goodwill toward Reo for making his service and maintenance job easier. Remember Reo's exclusive cowl-hinged hood? That feature makes the Reo Gold Crown Engine more accessible. It's easier to get to and work on.

The pride of possession Reo owners show could well come from *any* of Reo's superior features. For instance, look at Reo's tough, chrome-molybdenum iron block, dual-primary brakes, Tocco (electric) hardened crankshaft, 7 main bearings, and extra-gauge steel rail frame.

These extra-quality features are all yours in Reo trucks. It means you pay less because you get more value.

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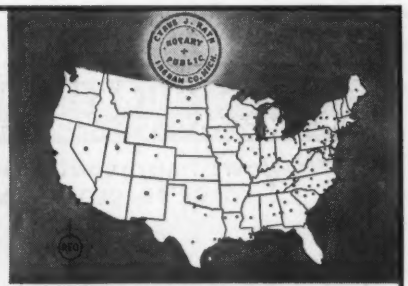
Sharp-eyed, hard-fisted truck men want proof!

Reo offers you undeniable, incontestable proof. Signed and sealed by State Authorized Notary Publics.

Notarized Proof! A medium-duty Reo hauled 10,000 lbs. of furniture from New York City to Los Angeles in *93 hours* to set a transcontinental record. Trip was timed by American Trucking Associations officials.



Notarized Proof! Hundreds of Reo dealers throughout the U. S. are ready to serve you with skillfully trained mechanics using genuine Reo parts . . . as are the many Reo Distributors and Factory Branches shown on the map above.

Notarized Proof! Drivers who won all first and second place awards drove Reo trucks in the American Trucking Associations' National Truck Roadeo. And 22 State Roadeo winners also won with Reo trucks.

Notarized Proof! A Chicago garage serviced major Reo units in 20% less average time than required on competing trucks. *(Copies of complete affidavits available on request.)*

See your REO dealer before you order any truck

REO
TRUCKS AND BUSES

A. Merrill et al, 13-9s-9w, 10 mi. SE Rison, dry, TD 4,370 ft.

Logan County: Ark. Okla. Gas Co. 1 S. B. Wall, 29-5n-27w, dry, TD 4,777 ft.

Ouachita County: Jack Carnes 1 James Roberson Hrs., 36-13s-19w, 10 mi. W Camden, Cotton Valley 3,180 ft., Buckner 4,003 ft., Smackover 4,162 ft., dry, TD 4,262 ft.

Phillips County: McAlester Fuel Co. 1-A Howe Lbr. Co., 27-3s-2e, 30 mi. NE DeWitt, Tuscaloosa 4,350 ft., Paleozoics 4,456 ft., dry, TD 4,576 ft.

OHIO, KENTUCKY

Recompletions Make Good Producers

COLUMBUS.—Three wells drilled deeper to lower sands furnished the best of the current oil completions. In Jackson Township, Knox County, Shuff & Bucy 1 Sarah Cotrell, Section 7, was drilled from the Newburg to the Clinton sand at 2,917-70 ft. with a good showing of oil natural and 120 bbl. the first day after shot. On the adjoining tract to the east, the Preston Oil 1 R. E. Melick, Section 7, found the Clinton at 2,944-98 ft. with an intitial production of 48 bbl. in 24 hours after shot. The National Gas & Oil drilled their 1 Henry Haas, Section 18, Harrison Township, Muskingum County, from the Clinton to the Medina sand at 4,158-64 ft. After a 20-qt. shot, the well made 41 bbl. in 24 hours.

E. A. Fierbaugh et al 1 George Johnson, Lot 3, Troy Township, Ashland County, extended the new Clouser pool one location southeast. Clinton sand at 2,497-2,505 ft. gaged 1,300,000 cu. ft. of gas natural which may be shot before completing.

The inactive Corning grade pool in Hardy Township, Holmes County, had a completion this week. Lydic & Shafer 2 W. B. Pyers, Lot 31, found the lower Clinton at 3,522-72 ft. with a fair show of oil and gas. After shooting, from 30 to 36 bbl. per day is being swabbed from the well. The operators have moved to the second tract east for another test.

Locations for the week were off to 21 from 11 counties. Meigs and Washington counties led with 4 each, while Ashland, Muskingum, Perry, and Hocking counties had 2 each. Completions totaled 28 with Lancaster field, having 8, Ashland 7, and Cambridge 6.

OHIO WILDCAT FAILURES

Ashland County, Troy Township: E. A. Fierbaugh et al 1 D. W. Stentz, Lot 52, Clinton, TD 2,576 ft.

Columbiana County, Yellow Creek Township: East Ohio Gas Co. 1 F. & J. Salsgiver, Sec. 35, Oriskany, TD 4,518 ft.

Coshocton County, Pike Township: Pure Oil Co. 1 J. W. Phillips, Sec. 11, Clinton, TD 3,423 ft.

WESTERN KENTUCKY

OWENSBORO.—A revival of interest in Todd County may result from a report that Ryan & Sharp have gas and some signs of oil at 1 George Kennedy, about 5 miles northwest of Guthrie and near the southern state border. Gas was estimated at 2,000,000 cu. ft. from the Devonian at total depth of 1,202 ft.

The McClosky formation appears to be nonproductive at Delta Drilling Co. 1 Haleman, NE SW SW 21-M-22, Webster County. A 1-hour drill-stem test at 3,165-69 ft. recovered 22 ft. of mud and a 4-hour test had 2,400 ft. of gas, 60 ft. of mud, and 70 ft. of salt water.

The Webster County deep test, Pure Oil Co., Ashland Oil & Refining Co., and I. B. Browning 1 M. L. Walker, NE¼ 22-N-24, is below 2,555 ft. This well is scheduled as a 7,500-ft. test.

In South Morganfield pool, Texas Co. has completed 1 C. B. Offutt, 23-O-19, with an initial production of 218 bbl. of oil and 22 bbl. of water per day from the Pennsylvanian at 1,396-1,426 ft. The opening well of the pool also produces from the Pennsylvanian, but since the discovery, three other pays have been added. These are: Waltersburg, Hardinsburg, and McClosky—all in the Mississippian.

WESTERN KENTUCKY WILDCAT FAILURES

Butler County: I. B. Green 1 R. Abbott, NW NE NW 10-H-32, dry, TD 1,180 ft.

Henderson County: George O'Neal and G. L. Parris 1 Sherrill Heirs, SE NE NW 18-Q-20, dry, TD 2,775 ft.

Webster County: Delta Drilling Co. 1 Mrs. J. E. Haleman, NE SW SW 21-M-22, dry, TD 3,234 ft.

EASTERN KENTUCKY

ASHLAND.—Dyer, Patterson and Roeder 1 J. Alexander Heirs, 16-O-67, Estill County, is drilling ahead at 1,050 ft. after top-

(Continued on page 133)

ILLINOIS

Franklin County Well Has O'Hara Show

MATTOON.—C. H. Murdick has set casing through the O'Hara at 1 J. T. Chenault Heirs, NE SE NW 31-5s-3e, Franklin County. A 1-hour drill-stem test of the O'Hara at 2,814 ft. recovered 850 ft. of gas, 30 ft. of oil, and 30 ft. of mud-cut oil. The well also had a show of oil in the lower Cypress at 2,641-54 ft. Total depth is 2,993 ft. The well is located northeast of North Benton pool and south of Whittington pool.

In White County, Carter Oil Co. has set casing to 3,040 ft. at 1 Carroll, NW NW NW 19-4s-13w, for a test of the McClosky at 2,962-66 ft. and 3,022-66 ft. A 2-hour drill-stem test at 2,963-83 ft. recovered 410 ft. of oil and 1,700 ft. of salt water. The well is located near the Illinois-Indiana line.

Magnolia Petroleum Co. continues testing at 1 Martha Drake, NE SE NW 23-4n-7e, following a 20-qt. shot of the Cypress at 2,599-2,609 ft. Well swabbed 33 bbl. per day while cleaning out.

Gopher Drilling Co. 1 Ross Cowling, SE SE NE 18-2s-13w, is cleaning out for a test of the Benoist sand at 2,571-89 ft. Well is west of Keensburg Consolidated field.

ILLINOIS WILDCAT FAILURES

Jasper County: Robinson & Puckett 1 E. Parr, NW NW NE 13-7n-10e, dry, TD 2,464 ft.

Clay County: Coy Oil Co. 1 Wolf Brothers, NE SE SW 29-5n-7e, dry, TD 2,955 ft.

Phillips Petroleum Co. 1 Kurr, NW SE SE 4-3n-6e, dry, TD 3,021 ft.

Hed Oil Co. et al 1 N. C. Gibson, NE SE NW 11-2n-5e, dry, TD 3,010 ft.

Clark County: Sam Burkitt 1 Evans, SW NW NW 28-12n-14w, dry, TD 485 ft.

Madison County: L. B. Cole and J. M. Hall 1 Schlechte, NW NE NW 29-6n-6w, dry, TD 707 ft.

Bond County: A. L. Ashworth 1 Smith, SW NE NW 24-4n-3w, dry, TD 1,120 ft.

Wabash County: F. J. Fleming Drilling Co. 1 L. D. Hall, NE NE SW 28-1n-14w, dry, TD 3,111 ft.

Wayne County: Ashland Oil & Refining Co. 1 Buchanan, SW SE NE 17-2s-7e, dry, TD 3,358 ft.

Edwards County: Superior Oil Co. 1 L. G. Chalcraft, SE NE NE 18-3s-10e, dry, TD 3,372 ft.

N. V. Duncan and W. Duncan 1 A. Marriott, SW SW SE 9-2s-14w, dry, TD 3,095 ft.

Franklin County: Superior Oil Co. 1 W. G. Melton et al, NE SE NW 13-5s-4e, dry, TD 3,383 ft.

White County: A. L. Walker 1 G. F. Hunt, NE NE SE 24-6s-9e, dry, TD 3,054 ft.

Washington County: T. M. Conrey 1 J. Gorski, NW NE SE 21-3s-2w, dry, TD 1,347 ft.

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MODEL DF2 for ⅜" to ½" chain. Safe pulling test 20,000 lbs. 20" handle. Weight each 12 lbs.

MODEL DF3 for ½" to ⅝" chain. Safe pulling test 24,000 pounds. 22" handle Weight each 15 lbs.

MODELS DF1, DF2 and DF3 are rugged, safe Load Binders featuring Never Spread Mouth. An exclusive feature designed and developed by Durbin-Durco engineers.

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MIDGET	No. 1—1 Swivel	¼" chain 2¼ lbs.
DELTA	No. 1—2 Swivels	⅜" or ½" chain 7 lbs.
DIXIE	No. 1—2 Swivels	½" or ⅝" chain 10 lbs.
LONE STAR	1—2 Swivels	⅜", ½" or ⅝" chain 14 lbs.
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SOUTHWEST TEXAS

Magnolia Opens New Field in Duval County

CORPUS CHRISTI.—A new oil field "DCR 79" for Duval County, has been opened by Magnolia Petroleum Co. 1 Duval Ranch Section 79, with an initial production of 68 bbl. of oil per day on pump from the Cole sand. Total depth is 2,539 ft., and 7-in. pipe is cemented at 1,552 ft. and perforations at 1,478-81 ft. This well is located in the CCSD&RGNG Sur. 79, 6 miles west of Freer.

W. A. Richardson 1-A Duerksen, wildcat test 1½ miles south of the Premont field and 3½ miles northwest of Premont townsite, in Jim Wells County, is running a production test after making a squeeze job at 5,795 ft. Total depth is 6,010 ft., and sand with oil odor was logged at 5,466-79 ft. and sand with gas odor at 5,543-60 ft.

Potential gage has been filed on King & Daubert 2 E. L. Armstrong, new wildcat discovery well in Jim Hogg County, approximately 2 miles south of Armstrong field and 13 miles southwest of Hebbronville. It gaged 99 bbl. of oil per day through a $\frac{1}{4}$-in. choke with 20 psi. tubing pressure and 320 psi. casing pressure, with gas-oil ratio of 120. Top of pay at 3,209 ft., and total depth 3,215 ft. with 7-in. casing set on bottom. Well is located in J. S. Williams Survey 295.

Continental Oil Co. 1 Clay West Burns Christenson, wildcat test approximately 1 mile northeast of discovery well at "Kittie Burns" field, and 5½ miles southwest of George West, in Live Oak County, has been gaged at 560,000 cu. ft. gas per day on open flow with gas-condensate ratio of 88,000, on completion through perforations at 7,170-84 ft. Shut-in pressure was 1,300 psi. This well failed to produce in the "Kittie Burns" sands below 10,000 ft. and the hole was plugged back from total depth of 10,313 ft. for completion. It is located in the Willis S. Novell Survey 58.

Tide Water Associated Oil Co. 2 Guaranty Title & Trust Co., in the West Corpus field of Nueces County, flowed by heads through perforations at 9,060-80 ft., making 90 per cent oil and the rest wash water. The well was acidized and flowed by heads, no gage yet. This will be a new oil pay zone for the field. The discovery well produces through perforations at 11,115-70 ft. The No. 2 well is located in Tract 5, J. C. Russell farm lots, Enrique Villareal Survey.

There were 39 new locations reported for Districts 1 and 4, with only 2 being wildcats, 1 each in Dimmit and Williamson counties. Four successful exploratory tests were completed, 1 each in Aransas, and Jim Wells and 2 in Brooks County. Six wildcats were dry, 2 in Jim Hogg and 1 each in Brooks, Hidalgo, San Patricio and Starr counties.

SOUTHWEST TEXAS (DISTRICTS 1 & 4)
SUCCESSFUL WILDCATS

Aransas County: New gas sand, Fulton Beach field—Placid Oil Co. 2 A. C. Glass et al, Ocean View Section, Gilliland & Lockhart sur., top pay 8,236 ft., TD 8,254 ft., perf. 8,236-46 ft., IP: 23,500,000 cu. ft. gas per day on open flow, with condensate, shut-in pressure 3,490 psi.

Brooks County: New gas pay, Gyp Hill field—Sun Oil Co. 1 Lowe-Middlebrook unit, in Sabas Perez survey 334, top pay 7,136 ft., TD 7,208 ft. perf. 7,136-60 ft. and 7,165-76 ft., IP: 3,800,000 cu. ft. gas per day on open flow, gas-condensate ratio 28,900, shut-in pressure 2,890 psi., no water.

Brooks County: New oil pool—The Texas Co. 1 Amanda C. Garcia et al, in H&GN RR Sur. 429, 10.9 mi. N-NW of San Diego, and 1½ mi. NE of Fitzsimmons field, top pay 4,497 ft., TD 5,041 ft., perf. 4,497-4,505 ft., IP: 90 bbl. oil per day through a $\frac{1}{8}$-in. choke, GOR 696,

"Gas Cooler Capacity Boosted 36%," says refiner

ONE plant manager reported this money-saving increase after thoroughly removing lime-scale deposits with fast-acting, safe Oakite Compound No. 32. Descaling procedure he used is simple:

Recommended solution of Oakite Compound No. 32 is allowed to soak overnight in water side of gas cooler. System is then drained, neutralized and pressure-rinsed. All scale is quickly removed. Inhibited against attack on metals, Oakite Compound No. 32 is far safer to use than raw commercial acid.

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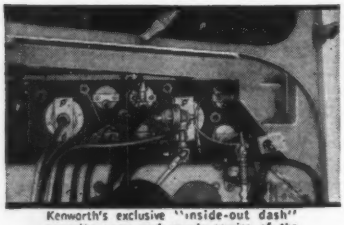

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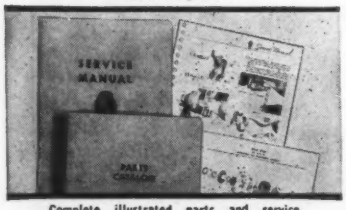

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Kenworth's continuous full length cab door hinges withstand heavy duty service.

Kenworth front spring pins and bushings are threaded and made of hardened steel.

Kenworth trucks breathe clean, fresh, cool air through an "open window", because the air cleaners on Kenworth trucks are outside mounted. Taking in cooler air from the outside rather than the hot air from under the hood, this outside mounted air cleaner increases the volumetric efficiency of the engine, resulting in materially better engine performance and a greater saving in fuel consumption. Another advantage of the outside mounting is its convenient location for servicing.

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TP 390 psi., casing sealed, gravity 44.4°, no water.

Jim Wells County: Gas extension to Magnolia City field—H. R. Smith-W. C. McBride, Inc. & Progress Petr. Inc. 1 Paula V. de Garcia, in R. J. Kleberg sur. 102, 7 mi. S-SE of Alice, and ⅘ mi. East of Magnolia City field, oil production, top pay 5,636 ft., TP 6,220 ft., perf. 5,636-46 ft., IP: 12,000,000 cu. ft. gas per day on open flow, shut-in pressure 1,000 psi., no water.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) WILDCAT FAILURES

Brooks County: Shell Oil Co., Inc. D-1 Jimmie L. Cage, in Leonardo Vargas "Guadalupe" sur., 5 mi. SW of Barrosa, 1½ mi. W of Cage Ranch gas field, dry, TD 8,500 ft.

Hidalgo County: Sinclair Prairie Oil Co. 1 Stella Grieninger, lot 30, Stratton subd. of porc. 74, approximately 4 mi. E of Cecil field discovery, 8 mi. N of Penitas, dry, TD 9,017 ft.

Jim Hogg County: Alaska Steamship Co. & J. E. MoWinckle 1 C. W. Hellen, Noriecitas grant, 2 mi. W of Hebbronville, dry, TD 3,960 ft.

Jim Hogg County: Rodney DeLange 2 M. Garcia Est., Sur. 150, 6 mi. SW of Randado and 1 mi. NW of Alworth field, dry, TD 2,560 ft.

San Patricio County: J. G. Gallaher 1 E. C. Caldwell et al, in Julia de la Garza Sur., 1½ mi. NE of Edroy, dry, TD 1,320 ft.

Starr County: Clark Fuel Producing Co. 1 Loreto Canales, tr. 3, sh 2-B, La Sacatosa grant, 22 mi. N of Roma, dry, TD 1,710 ft.

PERMIAN BASIN

Gaines County Discovery Completed for 175 Bbl.

MIDLAND.—The southwestern Gaines County Devonian lime discovery, The Texas Co., Humble Oil & Refining Co. and Ralph Lowe 1 T. E. Jenkins, Section 4, Block A-25, PSL Survey, was completed for 175.17 bbl. of oil in 24 hours. Flow was through a 16/64-in. choke. Production is through perforations from 9,100-35 ft. The wildcat failed in the Ellenburger and stopped at 11,705 ft. in granite. The pay section was treated with 1,000 gal. of acid. The discovery is 7 miles north of the Union (Clear Fork) pool.

Magnolia Petroleum Co. 1 W. C. Hicks, Track 16, League 273, Loving County school lands, southeastern Gaines wildcat, ran a 100-minute drill-stem test of the San Andres from 5,476-5,512 ft. Recovery was 360 ft. of drilling mud and 1,000 ft. of sulfur water. Drilling continued below 5,732 ft. in lime.

Magnolia 1 Winston Bros., Tract 72, Survey 37, Kirkland & Fields Subdivision, Scurry County wildcat 3½ miles southwest of Snyder, recovered oil on three drill-stem tests of the Pennsylvanian. On the last from 7,428-45 ft., open 75 minutes, it showed gas at the surface in 3 minutes. Recovery was 4,900 ft. of clean oil, 280 ft. of oil and gas-cut drilling mud and 340 ft. of salt water. Operator was drilling below 7,524 ft.

Magnolia 1-A TXL, Section 31, Block 40, T-4-S, T&P Survey, Upton County wildcat about 20 miles northwest of the Benedum field, on a drill-stem test of the Pennsylvanian from 9,321-45 ft. recovered 1,350-ft. water blanket, 860 ft. of 41°-gravity oil and 450 ft. of mud cut heavily with oil and gas. Operator is running another test of the same section. Two miles north of the Benedum pool, Republic Natural Gas Co. 1-E-A Rosa Halff Barnett, Section 40, Block Y, TC Survey, ran a 60-minute drill-stem test with packer at 11,565 ft. Recovery was 1,200-ft. water blanket and 30 ft. of drilling mud with no shows. It topped the Ellenburger at 11,580 ft. It was drilling below 11,667 ft.

Humble 1-A Barnett, Section 4, Block Y, TC Survey, 3 miles northwest of the field, which had been ordered plugged at total depth of 12,367 ft. in the Ellenburger having shown only small amount of gas and considerable salty water, has been taken over by Turner and Huegley. Humble retained an override and received consideration for well connections already installed. New operators will drill out cement and test various sections of the Ellenburger topped at 11,650 ft.

Deepening in the Ellenburger was under way after a drill-stem test in the Humble 1 Hugh Ferguson, Section 12, Block A-49, PSL Survey, Andrews County wildcat 4 miles east of the Nelson Ellenburger pool. With elevation of 3,394 ft., tentative top of the Ellenburger was called at 11,410 ft. First attempt at a drill-stem test failed at 11,420 ft. and operator deepened to 11,445 ft. Open one hour on the test from 11,411-445 ft., recovery was 1,500-ft. water blanket, 660 ft. of gas-cut drilling mud and 270 ft. of gas-cut muddy sulfur water.

Cities Service Oil Co. 1-Y University, Section 13, Block 13, University Lands, indicated 1-mile north extension to Wolfcamp production in the Shafter Lake pool, was drilling below 8,995 ft. in Pennsylvanian lime and chert. It will be carried to the Devonian, deepest producing horizon in the pool.

WEST TEXAS (DISTRICTS 8 & 7-C) SUCCESSFUL WILDCATS

Andrews County: Sinclair Prairie 1 J. Stevenson, Sec. 13, Blk. A-36, PSL, flowed 1,409,000 cu. ft. gas day, pay 2,945-85 ft., TD 10,490 ft.

Coke County: Hickock & Reynolds 1 E. C. Rawlings, Sec. 453, Blk. 1-A, H&TC Sur., 1 mi. W Bronte, pumped 72.6 bbl. 44°-gravity oil day, pay 4,348-56 Palo Pinto, TD 5,802 ft.

Lubbock County: Stanolind 1 J. F. Stinnett, Lab. 18, Lge. 4, San Augustine CSL, pumped 75 bbl. 26.5°-gravity oil day, top pay 4,685 ft., TD 7,000 ft.

WEST TEXAS (DISTRICTS 8 & 7-C) WILDCAT FAILURES

Andrews County: Gulf 1-X Univ., Sec. 2, Blk. 5, Univ. Land, dry, TD 5,763 ft.

Crockett County: A. W. Adkinson 1 V. D. Cox, Sec. 40, Blk. ST, E. Foster Grantee, dry, TD 1,201 ft.

Culberson County: Gulf & Grisham-Hunter 1 Grisham-Hunter-State, Sec. 16, Blk. 54, PSL, Ellenburger 10,960 ft., dry, TD 12,103 ft.

Fisher County: Snowden 1 McGee, Sec. 17, Blk. 21, T&P Sur., Noodle 3,498 ft., Flippen 3,820 ft., dry, TD 6,329 ft.

Irion County: Shell 1 State Univ., Sec. 3, Blk. 40, Univ. Land, 1 mi. SE Barnhart, Ellenburger 8,692 ft., dry, TD 9,863 ft.

Pecos County: Magnolia 1 Blackmon, Sec. 24, Blk. 3, H&TC Sur., dry, TD 2,146 ft.

Stonewall County: Humble 1 Searcy Smith et al, Sec. 136, Blk. D, H&TC Sur., dry, TD 5,432 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—A new discovery and commercial producer from the Drinkard section of east central Lea County is trying for completion at Skelly Oil Co. 7 Sims, 3-23s-37e. This wildcat flowed 64 bbl. of oil through 12/64-in. tubing choke in 24 hours. Production was from a perforated section above the plugged back total depth of 6,616 ft. Tests were continuing.

Magnolia Petroleum Co. was running swabbing test on its 1 Yates-Federal, 31-9s-36e, prospective discovery from the San Andres in north central Lea. The 9⅝-in. casing had been perforated from 4,810-25 ft. and the hole was swabbed dry naturally. Operator has now treated the zone with acid and is swabbing to test. All sections penetrated below 4,925 ft. have been tested, showing only small amounts of oil and some water. Those formations are now squeezed off with cement. Total depth is 4,950 ft.

SOUTHEASTERN NEW MEXICO WILDCAT FAILURE

Eddy County: Neil H. Wills 1 McLean, 1-20s-29e, Yates 1,535 ft., dry, TD 1,809 ft.

PANHANDLE SUCCESSFUL WILDCAT

Hartley County: Sinclair Prairie 1 Bivins, Sec. 5, Blk. 25, ELRR Sur., 8 mi. E and 1 mi. S Channing, flowed 5.5 mil. cu. ft. gas a day, pay 3,160-3,220 ft., TD 5,926 ft.

ROCKY MOUNTAIN

Maudlin Gulch Test Finds Oil in Sundance

DENVER.—Discoveries in Colorado and Wyoming in new pay zones attracted attention during the past week. In the Maudlin Gulch area of Moffat County, The Texas Co. and Frontier Refining Co.'s 2 Unit, SE NE SE 27-4n-95w, northwest of the Wilson Creek field, made oil on drill-stem test of the Sundance formation. Casing has been run and production tests are now being made. The drill-stem test was between 6,391-6,409 ft., and in the 1 hour 45 minute test, 3,320 ft. of 34°-gravity oil was recovered. The discovery well in this field was completed a year ago as a small producer in the Morrison formation between 6,061-6,229 ft. The present well also found saturation in the Morrison but was continued to the Sundance for a test of that formation.

In Silver Tip field, Park County, Wyoming, Seaboard Oil Co. of Delaware found a new producing horizon with the recovery of oil from the Tensleep formation. The well is 37-28-Government, NW SE SW 28-58n-100w, an extension in the Embar formation ½ mile northwest of the closest Embar producing well in the field. The test was made between 8,664-8,750 ft., with top of the Tensleep at 8,665 ft. On 75-minute test the well made an estimated 4,000 ft. of oil and gas cut mud, with considerable free oil and hydrogen sulfide gas. The oil was estimated between 46? and 48° gravity. The operator is now plugging back and completing the well as an Embar formation producer. A one-half mile northwest Frontier sand extension is now being completed, with the well making 120 bbl. of oil per day on 3-day swabbing test.

Oil was recovered by Phillips Petroleum Co. at its South Cole Creek wildcat at 1 Unit, SE SW NW 17-34n-76w, Converse County, Wyoming. The test was made between 8,217-8,233 ft. and 120 ft. of oil and 210 ft. of oil-cut mud with no water was recovered. A core between 8,206-8,221 ft. showed some saturated sand and top of the Dakota has been tentatively picked at 8,217 ft. The well has been deepened to 8,245 ft., still in sand, and the operator is now making another drill-stem test.

Shale oil has been found by Superior Oil Co. of California at 1 Sheldon-Dobler, Lot 1, Section 27-3n-1w (WRM), its extension in Pilot Butte field, Fremont County, Wyoming. The well is reported making approximately 100 bbl. of oil daily from a zone in the Cody shale between 773-779 ft. This field produces oil from the Tensleep and the Frontier formations, but there has been no previous shale-oil production in the field.

New locations.—Thirty-two new locations were announced, with 21 of the wells in Wyoming, 7 in Montana, 3 in Colorado and 1 in Utah. In the north central section of the Powder River Basin, Shell Oil Co. made location for a 10,500-ft. Madison test in the Clear Creek area, Sheridan County. The well is 1 Clear Creek, C NW SE 11-57n-78w, Sheridan County, 40 miles southeast of Shell's location on the Ash Creek structure in Big Horn County, Montana. In the Red Desert area of Wyoming, California-Wyoming Development Co. has made location

(Continued on page 133)

STATISTICS and

WEEKLY WELL COMPLETIONS . . . WEEK ENDED AUGUST 28, 1948

	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1948				
	Comp.	Oil	Gas	Dry	Footage	1948	1947	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	30	15	0	*15	34,074	1,017	1,046	0	0	0	0	0	0	0	0	0	0
Pennsylvania	48	21	4	†23	74,017	1,738	1,920	0	0	0	0	0	0	0	9	13	22
West Virginia	20	6	10	4	50,435	520	554	0	0	0	0	0	3	0	33	36	72
Ohio	28	4	9	‡15	73,397	903	864	0	0	0	3	3	2	0	9	23	34
Indiana	25	13	0	12	48,219	678	419	2	0	0	4	6	19	0	1	31	51
Kentucky	17	7	0	10	24,876	457	441	0	0	0	3	3	7	0	0	17	24
Illinois	61	28	2	31	163,226	1,535	1,329	0	0	0	14	14	31	0	1	239	271
Michigan	17	5	4	8	40,513	536	561	0	0	0	0	0	13	0	8	171	192
Kansas	66	27	7	§32	214,941	1,995	1,697	1	0	0	14	15	38	0	5	283	326
Neb., Mo., Iowa	0	0	0	0	0	5	4	0	0	0	0	0	0	0	0	4	4
Oklahoma	78	39	13	26	289,321	2,678	2,713	5	0	2	12	19	88	7	22	417	534
Texas	221	137	16	68	1,019,670	7,660	5,956	9	2	7	40	58	221	23	72	1,335	1,651
North Central (Dist. 7-B & 9)	75	39	1	35	214,567	2,396	1,927	6	0	0	20	26	80	0	10	475	565
West (Dist. 7-C & 8)	60	49	1	10	321,065	2,074	1,436	2	0	1	7	10	49	0	3	149	201
Panhandle (Dist. 10)	11	8	2	1	36,131	411	287	0	0	1	0	1	0	0	3	7	10
Eastern (Dist. 5 & 6)	6	4	0	2	28,711	359	342	0	0	0	0	0	9	2	0	75	86
Gulf Coast (Dist. 2 & 3)	40	21	7	12	261,728	1,212	1,035	0	2	2	7	11	52	18	21	290	381
Southwest (Dist. 1 & 4)	29	16	5	8	157,468	1,208	929	1	0	3	6	10	31	3	35	339	408
Louisiana	55	36	3	16	297,010	1,478	948	2	0	0	4	6	32	20	3	141	196
Northern	29	20	3	6	76,592	979	533	0	0	0	2	2	3	2	0	71	76
Southern	26	16	0	10	220,418	499	415	2	0	0	2	4	29	18	3	70	120
Arkansas	9	3	0	6	43,288	192	178	0	0	0	4	4	5	0	0	62	67
Mississippi	12	5	2	5	89,621	267	323	0	0	0	4	4	3	1	3	59	66
Southeastern States	3	0	0	3	8,685	35	38	0	0	0	3	3	0	0	0	33	33
Montana	11	7	0	4	27,377	183	176	0	0	0	0	0	3	0	0	14	17
Wyoming	30	21	0	9	119,883	344	151	0	0	0	4	4	19	0	1	39	59
Colorado-Utah	6	5	1	0	36,730	159	131	0	0	0	0	0	0	0	4	31	35
New Mexico	12	8	1	3	44,930	399	345	0	0	0	2	2	4	1	1	34	40
California	66	55	1	10	264,470	1,905	1,281	6	1	0	8	15	85	1	4	198	288
Total United States	815	442	73	300	2,964,683	24,684	21,075	25	3	9	119	156	573	53	176	3,180	3,982
Total previous week	795	444	61	290	2,760,121	23,869	20,339	23	3	5	109	140	548	50	167	3,061	3,826
Total August 30, 1947	736	391	94	251	2,510,369			10	7	4	86	107	445	63	138	2,597	3,243

Service wells included: *15, †23, ‡5, §2.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$2.17	....	....	....
19-19.9	2.19	....	....	....
20-20.9	2.21	$2.25	....	$2.12
21-21.9	2.23	2.27	....	2.14
22-22.9	2.27	2.29	....	2.16
23-23.9	2.30	2.31	....	2.18
24-24.9	2.34	2.33	$2.56	2.20
25-25.9	2.38	2.35	2.58	2.22
26-26.9	2.41	2.37	2.60	2.24
27-27.9	2.45	2.39	2.62	2.26
28-28.9	2.49	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.56	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.62	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point. †Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. (For detailed price changes in all fields see The Oil and Gas Journal, January 1, 1948, page 107.)

A.P.I. REFINERY REPORT, WEEK ENDED AUGUST 21

(Thousands of barrels)

District—	Crude runs, daily avg.	Production: Gasoline†	Kerosine	Gas & dist. oil	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline*	Kerosine	Gas & dist. oil	Residual
East Coast	875	2,432	369	1,195	1,450	22,671	10,364	19,558	11,741
Appalachian:									
District 1	104	321	32	93	89	2,026	432	701	394
District 2	31	91	6	39	76	887	87	242	170
Ind., Ill., Ky.	885	3,376	355	955	1,115	19,495	4,129	10,117	5,811
Okla., Kans., Mo.	477	1,674	108	713	558	8,179	1,333	5,072	2,073
Inland Texas	248	1,000	64	215	398	3,219	707	1,020	942
Texas Gulf Coast	1,400	4,039	612	2,126	1,814	14,465	2,369	7,854	7,727
La. Gulf Coast	442	1,353	306	773	587	5,307	1,489	3,781	2,130
N. La. and Ark.	86	231	52	99	160	2,181	491	513	245
Rocky Mountain:									
New Mexico	12	44	7	13	28	78	25	36	29
Other Rocky Mtn.	160	505	32	183	245	1,962	271	1,232	970
California	871	2,676	45	934	2,122	14,664	800	13,398	37,147
August 21, 1948	5,591	17,742	1,988	7,338	8,642	95,132	22,497	63,524	69,379
August 14, 1948	5,535	17,489	2,050	7,509	8,932	96,634	21,679	61,458	68,523
August 23, 1947	5,269	16,823	2,104	5,990	8,596	85,735	20,025	52,114	55,734

*Finished and unfinished. †At refineries including natural blended.

Bureau of Mines crude-oil stocks 221,736,000 bbl. as of August 21—up 81,000 bbl. One year ago 227,642,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.

East Texas	$2.65	Pecos County, Texas (Yates)	2.35
Kettleman Hills, California*	2.14	Bradford, Pennsylvania	5.00
Beauregard Parish	2.60	Eastern Ill. and Western Ind.†	2.77
Illinois Basin	2.77	Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

TRENDS

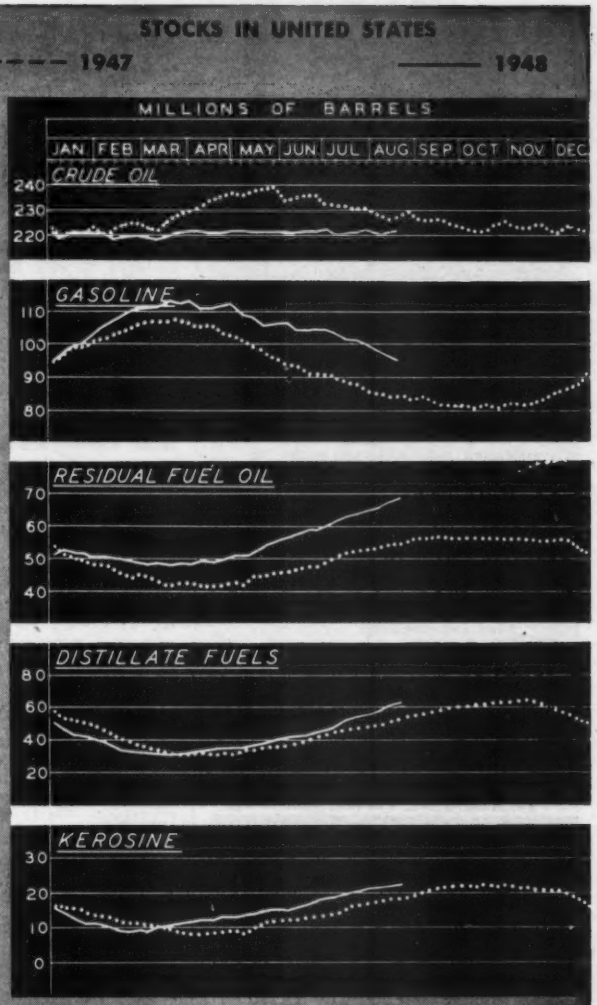
DAILY AVERAGE PRODUCTION FOR WEEK

	Aug. 28 crude oil	B. of M. Aug. demand	Aug. 21 crude oil
Alabama	1,350	1,300	1,350
Arkansas	82,925	90,000	82,825
California	950,200	955,000	948,900
Colorado	47,790	50,000	47,140
Eastern	64,600	66,200	65,900
Florida	810	800	810
Illinois	177,500	170,000	176,400
Indiana	21,200	16,000	21,100
Kansas	306,200	306,000	307,250
Kentucky	25,700	25,000	25,700
Louisiana	483,050	500,000	481,550
North Louisiana	113,850	.....	112,350
South Louisiana	369,200	.....	369,200
Michigan	45,900	46,000	47,300
Mississippi	129,685	130,000	127,320
Montana	26,200	27,000	25,290
Nebraska	400	700	400
New Mexico	132,970	138,000	132,960
Oklahoma	427,450	438,000	428,800
Texas	2,446,600	2,540,000	2,446,600
Dist. 1 (Southwest)	29,005	.....	29,005
Dist. 2 (Southwest)	178,900	.....	178,900
Dist. 4 (Southwest)	250,375	.....	250,375
Dist. 3 (Gulf Coast)	493,420	.....	493,420
Dist. 5 (Eastern)	49,575	.....	49,575
Dist. 6 (Eastern)	120,000	.....	120,000
East Texas field	304,000	.....	304,000
Dist. 7-C (West)	43,600	.....	43,600
Dist. 8 (West)	703,050	.....	703,050
Dist. 7-B (W. Central)	50,725	.....	50,725
Dist. 9 (N. Central)	137,850	.....	137,850
Dist. 10 (Panhandle)	86,100	.....	86,100
Wyoming	150,850	160,000	152,830
Total United States	*5,521,380	5,660,000	5,520,425
Change from prev. wk.,	up 955		

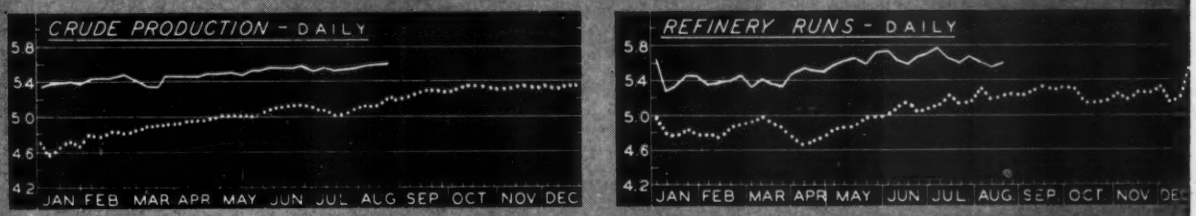
Total production January 1-August 28 .. †1,320,675,100 bbl.
Same period last year (crude plus cond.) 1,193,593,715 bbl.

*Not incl. 72,900 bbl. condensate. †Incl. 17,862,580 bbl. condensate.

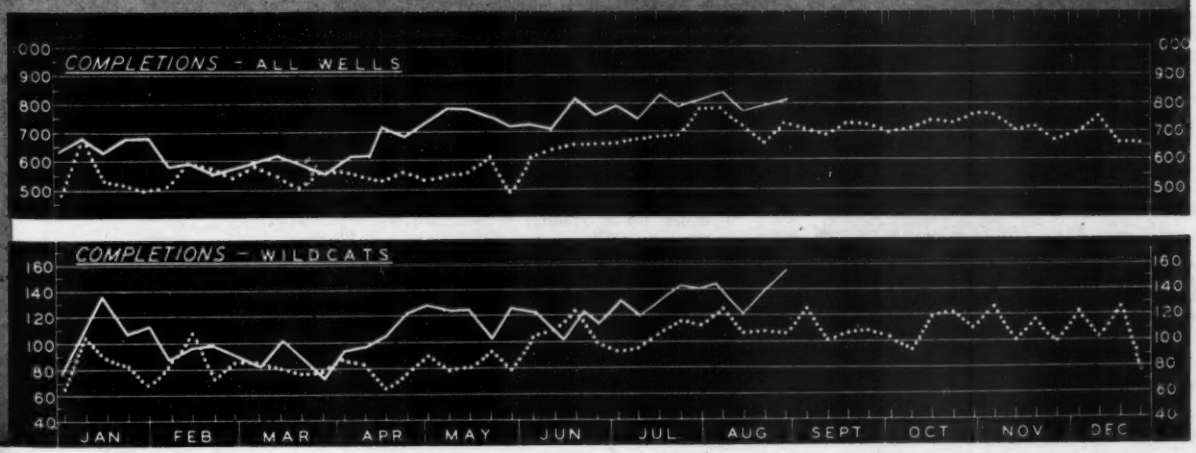
STOCKS IN UNITED STATES



DAILY OPERATIONS



WEEKLY COMPLETIONS



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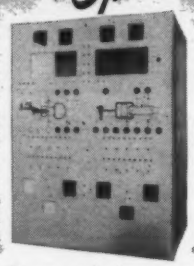

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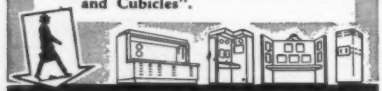

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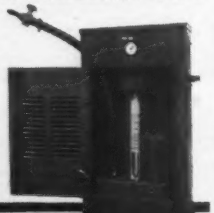

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MARKETS

SPOT movements of all petroleum products except No. 6 and No. 2 continued strong last week in the Mid-Continent area. Several buyers reported offerings from refiners indicating a continuing trend of the past several weeks toward a more equal balance of supply and demand.

The extreme weak market in No. 6 continued and according to one observer showed no signs of picking up in the near future. Market quotations for this material were again reduced last week listing generally a low of $2.10 and a high of $2.30. Actual sales, when made however, were at prices "considerably below $2.10" some buyers reported. Several marketers reported the demand for No. 2 had "dropped off just a little" in the past week.

Spot sales of gasoline were reported to be at 10½ cents, f.o.b. North Texas and East Texas; and at around 11 cents, f.o.b. Group 3. One refiner said that last week he had removed allocation restrictions on gasoline sales to his customers.

Storage a Problem

Several instances of refiners manipulating their storage so as to make room for light burning fuel oils were reported. High stocks of residual oils continued and storage of this material remained at a very high level. Refiners in the East and Gulf Coast areas were reported sharply cutting distillate and residual-oil yields last week.

Reports of offerings of fuel oil at "reasonable prices" over the winter season indicated that some refiners anticipated no difficulty in supplying their customers and in meeting demands for light burning fuel this winter season.

The tank-car situation continued to be generally favorable with clean cars easy to obtain and dirty cars somewhat more difficult to get hold of. Cars for shipment of natural gasoline continued "tight."

New York Harbor "Waiting"

In New York Harbor late last week the most generally quoted offering price for No. 2 was 10 cents per gallon but indications were that a number of buyers were waiting for a weaker market in this material in the next week or two, and the market for burning oils at least continued pretty much at a near standstill. Offerings of kerosine were not as numerous as No. 2 offerings and at the general open-market price of 11 cents per gallon buyers were reported "not attracted."

The market on heavy fuel oils continued weak and while a few sellers were still asking $3 for spot No. 6, buyers noted $2.46 purchases at the Gulf and were inclined to wait for a further softening. Prices generally remained unchanged along the Atlantic Seaboard.

Trading in petroleum products on the Gulf Coast continued at a slow pace. Demand for motor fuel from contract sources was still heavy and was expected to continue so until well after Labor Day, traditional turning point in the marketing season. On the open spot market, however, gasoline moved sluggishly and at prices a cent or more under what they were 2 months ago. Storage was reported filled with burning oils through the Gulf and East Coast. Barring an extremely cold winter, supply of these products is expected to be ample. No. 6 was still extremely weak and was bringing prices around $2 on the spot market.

Representative Quotations

Representative spot-market quotations of leading suppliers as of August 30, 1948. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	10¼-11	11.6-12* 10.5-11.9†	10½-11½
Premium gasoline, 78-80 octane	11½-12	10.6-13.4	11¼-12¼
42-44 w.w. kerosine	9½-10	10.3-11.7	9½-10¼
No. 2 straw fuel oil	9-9¼	9.4-10.1	9-9½
No. 6 residual	$2.10-2.30	$3.03-3.37	$2.10-2.65

*Branded (74-76 octane); †Unbranded (74-76 octane).

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	8½	8	8¼
Grade 18-55	10.2	9.6	9.9

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	12-14.5
750 vis., No. 3-4 neutral	15-17.25
2,000 No. 5-6 neutral	17-21

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	30-33
200 vis. No. 3 neutral, 0-10 pp.	20-21

Western Pennsylvania

145-155 vis. 10 p.t. bright stock	47
180 vis. p.t. neutral	45

CRUDE-SCALE WAX

Mid-Continent

130-132 A.S.T.M. melting point	6¼-6½

Rocky Mountain Area

(Continued from page 129)

for 1 Gov't, NW NW SW 19-44n-96w, on King Dome, Hot Springs County. The Utah location is for a wildcat in the Bitter Creek area of Uinta County, where Seaboard Oil Co. is building road for its 1 Unit, NW SW NW 10-10s-22e. The well will be a test of the Bridger formation at around 6,000 ft. This is Seaboard's first Utah operation, and thorough geologic work has been done in the area prior to making the location.

WYOMING WILDCAT FAILURES

Little Cottonwood, Platte County: Carl Co. 2 Herman, CSW NE 1-27n-68w, 723 TD, water 720-23, suspended indefinitely.

Lodgepole, Weston County: Bay et al 1 Christensen-Davis, C NW SE 9-44n-66w, 6,737 TD, suspended indefinitely, Newcastle 6,455, Skull Creek 6,313, Dakota 6,688, 7-in. csg. 6,730 ft.

Lodgepole, Weston County: Bay et al 1 Goodson-Smith, C NE SE 14-44n-66w, 7,257 TD, abnd., Newcastle 6,330, Dakota 6,530, Fuson 6,580, Lakota 6,610, First Sundance 6,695, Lower Sundance 6,920.

Beaver Valley, Weston County: Olds Oil Co. 1 Aminette, SW SE NW 12-43n-62w, 3,364 TD, abnd., Newcastle 3,168, Dakota 3,316.

NORTHERN NEW MEXICO WILDCAT FAILURES

Red Mountain, San Juan County: Southern Union Santa Fe Pacific, NW SE NE 1-21n-9w, 4,800 TD, abnd., Pictured Cliffs 330, Dakota 4,590, water.

Kentucky Fields

(Continued from page 126)

ping Corniferous limestone at 105 ft. Drilling will continue on to and into the Knox dolomite formation. Location is about ¾ mile north of town of Ravenna and about 8 miles southwest of the Furnace gas field.

Lilly et al 2 John Riley in 14-V-71, Fleming County, is drilling at 1,390 ft. Operators are expecting Knox dolomite in the next 200 ft. Test is being closely watched as it offsets a 1,582-ft. well that is reported to have had shows of oil and gas in the lower formations.

A new location has been announced for western Powell County. This new test will be known as A. H. Carpenter 1 James Hall, 9-P-67, and is approximately 7 miles northwest of Furnace (St. Peter) gas field.

INDIANA

EVANSVILLE.—The Rosiclare production opened by Illinois Mid-Continent Co. 1 McFarland-Andrews, NW SW NW 19-1s-11w, Gibson County, may prove to be an important addition to the area. Following good results from a drill-stem test at 2,346-59 ft., the operator set casing to total depth of 2,438 ft. and perforated opposite the pay with 31 holes. The lime pay was treated with 2,000 gal. of acid and the well flowed 85 bbl. of oil the first hour. Production is now down to 8 bbl. per hour through ½-in. choke.

The area around the recently opened Rochester pool continues to furnish good wells. Ryan & Sharp 1 Yarbor et al, SE SW SW 12-2s-13w, Gibson County, has been completed with an initial production of 800 bbl. per day from the Waltersburg at 1,898-1,958 ft. In the same section, Ralph Halbert has completed 1 E. J. Lennert-State Unit, with an initial production of 550 bbl. per day from the Waltersburg at 1,902-56 ft.

INDIANA SUCCESSFUL WILDCATS

Gibson County: George S. Engle 1 John S. Teel, SE SW NW 16-3s-11w, IP 122 bbl., Waltersburg, 1,685-88 ft., TD 1,702 ft. (Discovery well for McGary pool).

Vanderburgh County: Gilliam Drilling Co. 1 H. Spilker, SE SW NW 12-5s-11w, IP 198 bbl., McClosky, 2,452-58 ft., TD 2,597 ft. (Discovery well for Darmstadt pool).

INDIANA WILDCAT FAILURES

Miami County: A. R. Snyder 1 J. E. Yarling, NW SE SW 11-26n-3e, dry, TD 966 ft.

Posey County: T. B. Dirickson 1 A. Redman, SW NW NE 26-5s-13w, dry, TD 3,005 ft.

Yingling Oil Co. and Ashland Oil & Refining Co. 1 Johnson-Roehr, SW SW NW 5-6s-12w, dry, TD 2,480 ft.

Gordon Oil Co. and Moses & Stewart 1 Mary E. Dixon, NW SE NW 7-8s-13w, dry, TD 2,732 ft.

CALIFORNIA

Union Testing Prospect On Disputed Army Site

LOS ANGELES.—Union Oil Co. has placed its prospective discovery on the Jesus Maria Rancho in Santa Barbara County, the 1 Jesus Maria, 34-8n-35w, on pump in an effort to reduce water pressure and test for oil. The venture cored a considerable section of oil-saturated chert on the way to bottom at 2,274 ft., but water came into hole with such force that the first pump installed failed to lower the water level. Union, consequently, installed a larger pump and changed the liner. Latest reports indicate that the water level is now being lowered successfully and that a conclusive test probably can be made within a few days.

The test is being watched with considerable interest inasmuch as it is located on Camp Cooke, a military reservation slated as a permanent training location for new draftees. The Government, which overlooked the mineral rights when the land was purchased for the camp in 1940, has been attempting to buy up the mineral rights under the reservation for $2 an acre, and condemnation suits have been filed by the Army almost daily. Holders of mineral rights in the area have refused the Government offers so far and are hoping that Union gets a substantial discovery since it would greatly enhance their standing in court.

Another new play being followed with keen interest by California operators is in the Pattiway area near the intersection of Kern, San Luis Obispo, and Santa Barbara counties, where Anderson & Associates have leased approximately 6,000 acres.

CALIFORNIA SUCCESSFUL WILDCATS

Kern County, Commanche Point area: Tejon Hills Oil Co. 3 Tejon Hills, 10-11n-18w, flowed 70 bbl. daily through 22/64-in. choke, water cut 29 per cent, 35 ft. perf. liner landed 420 ft., elev. 1,004 ft., TD 420 ft.

Edison area: J. Paul Getty 1 Alexis, 17-30s-29e, pumped 55 bbl. daily, elev. 492 ft., TD 3,450 ft.

Mount Poso area: Ring Oil Co. 20-1 Well, 20-28s-20e, pumped 50 bbl. daily, gravity 16°, water cut 12 per cent, 42 ft. perf. liner landed 2,336 ft., elev. 1,063 ft., TD 2,337 ft.

Trico area: Trico Oil & Gas 3 Lee Comm., 17-24s-23e, IP 3,500,000 cu. ft. gas, perf. 2,470-90 ft., 2,117-40 ft., elev. 216 ft., TD 2,600 ft.

Los Angeles County, Athens area: J. P. Getty, Trustee, 1 Howard Park fee, 12-3s-14w, pumped 190 bbl. in 16 hr., 2 per cent cut, elev. 202 ft., TD 8,939 ft.

Monterey County, San Ardo area: Jergins Oil Co. and North American Consol. Oil Co. 62-11-Ferrini, 11-23s-10e, flowed 200 bbl. daily, gravity 11°, water cut 5 per cent, elev. unknown, TD 2,140 ft.

Santa Barbara County, Casmalia area: Union Oil Co. 1 Jesus Maria, 34-8n-35w, pumped 74 bbl. daily, elev. 460 ft., TD 2,274 ft.

CALIFORNIA WILDCAT FAILURES

Kern County, Ant Hill area: D. D. Feldman 1 Feldman-M. & T., 2-29s-29e, dry, elev. 711 ft., Vedder 2,800 ft., TD 3,060 ft.

Lerdo area: Independent Exploration Co. 22 Lerdo-Sill, 33,28s-27e, dry, elev. 529

(Continued on page 138)

MICHIGAN

"New Heath" Pool Has Five Producers

SAGINAW.—The recently discovered New Heath pool in Allegan County now has a total of five producing wells, with J. W. Lang Co. et al completing two of the new wells and P. K. Degenther bringing in his first successful venture in the field. The new Traverse lime field was discovered in July of this year by Lang Co. 1 Boyce which was good for 100 bbl. of oil initial production. Of the new completions the company's 2 Heck, northernmost well in the field, was rated 60 bbl. per day, and the 1 Boyce-U. S. Government, west offset to the discovery well, was rated 10 bbl. per hour. Both wells were acidized. Degenther 2 U. S. Government, the first completion on totally owned federal government lands, reported a flow of 400 bbl. per day after acid treatment.

Gulf Refining Co. completed its best well in the Pentwater field, Oceana County, another discovery early this year that is being developed rapidly. Gulf 2 Padziunas, finished at 2,089 ft., flowed 223 bbl. of oil per day after acidization, and the company has staked location for the 1 Jenson 1,320 ft. south of the 2 Padziunas. One mile to the northwest, Welsh Oil Co. 1 Wright, producing extension to the field, made as much as 400 bbl. per day but reportedly pinched back to 150 bbl. with plans to cut production to the 100-bbl. daily limit voluntarily established by operators in the field. All production in the field is from the Dundee.

CANADIAN FIELDS

Pincher Creek Prospect Continues Testing

CHATHAM, Ontario.—In the Pincher Creek area, in the southwestern Alberta foothills, Canadian Gulf-Pincher Creek 1, LSD 15, 24-3-29w4, bottoming in Madison limestone at 12,516 ft., is continuing tests of various porous horizons in the limestone. In initial tests two sections, at 12,166-94 ft. and 12,058-76 ft., were perforated. After acidizing the well was swabbed and started flowing at maximum rate of 1,700,000 cu. ft. of gas, recovering 216 bbl. of load oil. Later the well started to flow about 2 bbl. an hour of 48.9°-gravity crude. Swabbing and testing are being continued.

Cretaceous producer.—The most interesting development is the completion of Continental-Leduc-Woodbend 3, LSD 12, 7-51-5w4, in the Woodbend extension as a commercial producer from the lower Cretaceous horizon. Drilled originally to 5,534 ft. without getting the D-3 and nonproductive in the D-2 zone, the well was plugged back to test the upper horizon. In a 1¾-hour drill-stem test at 4,205-11 ft., gas flowed at the rate of 100,000 cu. ft. a day and oil rose in 27 minutes, flowing 28 bbl. in the first hour. Gravity of the oil is 37.2°, much lighter than the normal Cretaceous oil in Alberta and very similar to the Devonian crude in the Leduc field. The Imperial-Volmer 1 near Morinville, recently abandoned, showed about 20 bbl. of 29°-gravity crude from the Cretaceous.

Saskatchewan.—Oil production in the Lloydminster-Lone Rock field in Saskatchewan for the six months ending June 30, 1948, totaled 374,065 bbl., more than doubling the 164,445 bbl. for the same period of 1947. June production was 82,603 bbl. against 47,506 bbl. the same month last year.

EQUIPMENT MEN ... in the News

Swan of International Harvester Retires

Maurice J. Swan of International Harvester Co., well-known figure on the media-purchase side of advertising, retired July 1 after 47 years in Harvester's service.

Swan's long career began with his employment as office boy for McCormick Harvesting Machine Co. a year before this company and other leading factors in the manufacture of farm equipment were consolidated under the International Harvester name in 1902. Since 1917 he has been the primary point of contact between the company and the many types of publications carrying the advertising of Harvester's diversified products.

The company's announcement states that, while no specified successor will take over Swan's duties, press representatives will contact key individuals in the consumer relations department closely identified with various advertising and sales fields. Agency media departments will also play a more active role, necessitated by the broad range of products and the divisionalization of Harvester operations.

Young & Rubicam, Inc., Chicago, has recently been named as agency for International trucks. Aubrey, Moore & Wallace continue with farm tractors and equipment, industrial power, and refrigeration.

Adair to Represent Baird

R. B. "Bob" Adair, formerly Kansas district manager for Mountain Iron & Supply Co., has joined the sales division of Baird Manufacturing Co. of Tulsa.

H. J. Sheridan, owner, states that Adair will represent the Baird line of production and well-servicing tools in Kansas. His headquarters are at 237 South Main Street in Wichita. Baird tools are handled by a number of supply stores throughout the country.

The main office and manufacturing plant is located at 3105 Sand Springs Road, Tulsa.

Lebanon Names Platz

Edward H. Platz, Jr., veteran steel executive in the development of alloy castings for special purposes, has been appointed manager of alloy sales for Lebanon Steel Foundry, Lebanon, Pa.

NEW UNITED SUPPLY STORE OF ALICE, TEX.

United Supply & Manufacturing Co., Tulsa, has recently opened its seventeenth store, located at Alice, Tex. A complete stock of supplies necessary for the operations of producing companies, drilling contractors and pipe-line companies is carried. This makes the fifth store this company has on the Gulf Coast, the other stores being in West Texas, Louisiana, Kansas, New Mexico, and Oklahoma. The store is presided over by Clifford Gilbert, assistant district manager, and Glenn Brents, store manager. Shown in the picture are Bill Shelton, counter man; Glenn Brents, store man; Clifford Gilbert, assistant district manager, and Mason Erwin, field salesman

New Construction Firm Formed

Harvey C. Cranfill, vice president of the Consolidated Western Steel Corp., announces the formation of the wholly owned subsidiary Consolidated Western Constructors, Inc., with headquarters in the M & M Building, Houston. The officers of the construction organization are almost identical with the parent company, the exception being William E. Goodere, who has been transferred to Houston from the Los Angeles office and has been elected vice president in charge of operations.

George F. Russell, Jr., consulting chemical and petroleum engineer, has been named manager of the natural gas and gasoline division. He brings into the organization over 15 years of varied experience in the field of natural-gas processing and production. He was formerly associated with Hudson Engineering Corp., Standard Oil Co. of New Jersey (Louisiana division), and Phillips Petroleum Co. and was assistant professor of chemical engineering at University of Oklahoma, and associate professor of natural gas and petroleum engineering at Louisiana State University.

Thomas C. Main is a new member of the design staff, being chief chemical and process design engineer. He was formerly chemical engineer in charge of research and development for Fomac Engineers, petroleum chemical consultants in the McCarthy chemical and absorption plants at Winnie, Tex. Prior experience was with the Esso Laboratories of the Standard Oil Co. of New Jersey (Louisiana division), Baton Rouge, where he served for 5 years as a chemical engineer.

George E. Little, a graduate in mechanical engineering from University of Akron, has been placed in charge of the estimating group. He has had 22 years' experience in the field of general heavy industrial construction, and formerly served in various engineering and supervisory positions with Brown & Root Construction Co., Houston; Giffels & Vallet, heavy industrial construction engineers, Detroit; Chicago Bridge & Iron Works, Birmingham; and Combustion Engineering, St. Louis.

The new company, which was formerly the construction division of Consolidated Steel Corp. of Texas, Orange, specializes in the design, engineering, and construction of natural-gas and oil processing plants.

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED

All ads, 12 cents a word. Minimum charge, $3.00 per insertion.
Centered Line, any ad, $1.00.
Box Numbers count 9 words when replies are to be sent to our Tulsa Office. Replies forwarded without charge.

DISPLAYED, PER INCH

$12.00 per column inch per insertion. One-point border and 12-point capitals are allowed. Larger type sizes not accepted.

All classified advertising payable in advance.
10% Discount if 3 insertions are ordered at one time.
COPY DEADLINE, 9:00 a.m. Monday prior to each week's issue.

THE OIL AND GAS JOURNAL
P. O. Box 1260, TULSA, OKLAHOMA

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

WE have just revised our used gasoline plant catalog of surplus material, and a copy is available upon request. Cities Service Oil Company, Patridge, Bartlesville, Oklahoma.

FOR SALE: Marmon-Herrington Model 555-4 all-wheel drive truck with 14 ton rating complete with Hercules RXC 6 cylinder engine, Westinghouse air brakes, 1100 x 20 tires: Ideal as tractor or bobtail off and on highway where traction is required. Details by application to Truck Equipment Sales Corp., 2815 Navigation Blvd., Houston, Texas, C4-0481.

MANUFACTURERS LATEST DESIGN

Hydraulic Casing Pulling Units. Complete line of equipment. Units made to your specifications. Truck Mountings or Skid Units. Repair Service and Parts.

OKLAHOMA MACHINE & SUPPLY CO.
Ada, Oklahoma

FOR SALE

No. 83 Speed Star Spudder. Mounted full trailer on hard rubber wheels, 4000' drilling and sand lines, complete tailing-in tools, dog house, Kohler light plant, etc. Very portable, good condition.

W. R. BOWMAN
214 Kennedy Bldg. Phone 7-3108 or 2-2633
Tulsa, Oklahoma

1942 AND 1943 BOILERS AVAILABLE NOW

3—Erie City Water Tube, three Drum, Stirling type, 210 H.P., 200# W.P. Built 1942. With Pulverizers. Condition excellent. Priced to sell, F.O.B. Cars, Arkansas.

3—Kewanee Firebox, two pass. Series 500, Hi-Pressure, Heavy Duty. 87 H.P., 100# W.P. Built 1943. With burners. Condition excellent. Priced to sell, F.O.B. Cars, Oklahoma.

OTHERS TO SELL

PETROLEUM EQUIPMENT, INC.
P. O. Box 887, Phone 2-6291
Tulsa 1, Oklahoma

EQUIPMENT FOR SALE

FOR SALE: Wilson Master Model Winch powered by 6 MZR Waukesha engine. Unit mounted on one and one-half ton Chevrolet truck equipped with fifty foot single pole telescoping mast. Terms. Melton Supply Company, Seminole, Oklahoma.

PIPE FOR SALE: A-1 guaranteed used lapweld oil and gas well casing, tubing, and line pipe. Sizes 8⅝" O.D. 24 lb., 7" O.D. 20 lb., 7" O.D. 17 lb., 5½" O.D. 14 and 15 lb., 4½" 13 lb. casing. 2⅜" O.D. 4.60 lb. Upset and 2⅜" O.D. 4.50 lb. Regular Tubing. 4" I.D. 11 lb., 3" I.D. 9 lb., 2⅜" O.D. 3.75 lb. Line Pipe. Also 8" and 6" Line Pipe. Write: Bryson and Jaynes, P. O. Box 831, Clarksburg, West Virginia. Phone 4010.

FOR SALE: Used IDEAL Rotary Steam Drawworks suitable for 10,000 to 12,000 ft. drilling. The National Supply Company, Fort Worth, Texas.

TRUCKS: I. C. C. Authority — Oklahoma, Kansas, Illinois, Indiana: 1944 Dart Tandem Cummings Diesel Engine; 1947 C-70 Auto Car Truck; 1947 Montgomery Tandem Float; 1946 International K-7; two 1945 International K-7; 1940 International D-35; 1947 Ford Pickup; and 1942 Model L Allis-Chalmers Tractor with blade, 70 Tulsa winch. Trucks equipped with Montgomery bodies, winches, dual wheel pole trailers. Box C-519, The Oil and Gas Journal, Tulsa, Oklahoma.

IDECO Drilling Machine—Complete with Tools from 10 inch to 4½. Stems, Bits, Bailers, Calf Reel capable of drilling to 5,000 ft. NEW—has drilled 3 wells. Can offer purchaser a contract for 2,000 ft. hole at location of Rig. Write Geologist, 1501 Clarence Ave., Lakewood 7, Ohio.

FOR SALE: Two new 6NKU Waukesha. Delivered 7/1/48. Stored under cover. List price. No bonus. No trade. Harris Drilling Company, 525 Wichita National Bank Building, Wichita Falls, Texas.

OIL WELL CASING, new, 5½" and 7", J-55 casing available 12 month contract basis. Prompt confirmation. Early delivery. Allied Products, 5921 Troost, Kansas City, Missouri. Delmar 4225.

PRACTICALLY NEW LATEST TYPE U-15 UNIT RIG

Purchased new May 1948. Drilled total 16,000 feet of hole.

Powered by two NKU Waukesha engines and includes 127-foot Lee C. Moore mast and substructure, 7¾ x 16 Gardner-Denver pump, 50 x 36 block, 4125 B-J hook, SS625 Ideco Swivel, HS171-B Ideco rotary, LRF Thompson shale shaker, 7½ KW generator, 4 x 6 water pump, pipe straightener, complete accessories and 7000 feet 4½" grade E drill pipe. Write for complete inventory.

LUCEY PRODUCTS CORPORATION
Tulsa, Oklahoma

WE BUY and SELL

Steel Pipe and Tubing
Pipe Fittings—Well Casing
Culverts and Valves

SONKEN-GALAMBA CORP.

2nd & Riverview, Kansas City 18, Kans.

EQUIPMENT FOR SALE

DRESSER COUPLING PARTS: 1,920-20" x ⅛" center rings, 3,840 followers—Used—Good Condition—Not cleaned. Colorado Interstate Gas Company, P.O. Box 1087, Colorado Springs, Colorado.

6,000 FT. 2½" TUBING
J-55 EUE 8 RD. THD. To be sold with light rotary drilling rig. IDECO draw works on steel substructure with 60' mast handles 6,500' tubing or 2,000' 3½ drill pipe. 4 x 6 Gaso pump, light plant, dog house, Brewster 12" rotary. Complete assortment of hand tools, 7,500' swab line, subs, connections, and miscl. equipment to make rig complete to last detail. Box 123, Lubbock, Texas.

FOR SALE: Located at Bartlesville, 1—Model 37 Sullivan Shot Hole Drill mounted on 1942, 134" wheel base, 2 speed, dual tired truck. Price $4,000. Cities Service Oil Co., Patridge, Bartlesville, Okla.

FOR SALE: L-71 Cardwell Draw Works: Allis-Chalmers Double Pole Type "E" mobile unit; Allis-Chalmers Single Pole Type "UM" mobile unit. All A-1 condition. P.O. Box 3246. Corpus Christi, Texas.

TWO new 7¼ x 14 and one new 7¼ x 10 Gardner-Denver Power Pumps. Subject to prior sale. Box C-549, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Model 50 Wichita Falls spudder with steel mast, PA-100 International motor, butane equipped. Now working on 2500 ft. top to bottom hole. Available end of present well. Shelby McIntosh, Box 198, Owensboro, Kentucky. Telephone 2640-W.

FOR SALE at Bartlesville: One used Model-37 Sullivan shot hole drill, mounted on Ford truck. $3,000. Cities Service Oil Company, Patridge, Bartlesville, Oklahoma.

FOR SALE

One Rotary Drilling Rig, Complete A-1 Condition, Wilson Mogul with D 13000 Caterpillar Engines 87 Feet Lee C. Moore Portable Derrick. Good 4½" Drill Pipe.

GEORGE S. ENGLE, BOX 655
EVANSVILLE, INDIANA
Phone 5-5179

FOR SALE

12—230 H.P. Type 10 Bessemer New 17" Power Cylinders complete ready to run with 16" to 18" Compressors. 1—230 H.P. Clark Horizontal with Compressors. Located Salem, Illinois.

ENGLE PETROLEUM, Incorporated
Box 655, Evansville, Indiana

FOR SALE
CARDWELL WELL SERVICING UNIT

Mounted on new 3-ton Mack Truck, 50' twin-leg telescope mast, complete with:
Tubing Tools
Rod Tools
Sand Pumps
Sand Lines
Miscellaneous Tools.
Also, 3,300'—17# 7" Lapweld Casing, 90'—16" Lapweld Casing, 100'—10" Lapweld Casing. Contact:

A. P. ADAMSON,
5806 East Eleventh, or Phone 9-3684,
Tulsa, Oklahoma

PARTS FOR ARMY TRUCKS

New and Used

Largest stock in America, 6x6, 6x4, 4x4, 4x2. All items guaranteed. Largest auto wrecking house in the west with most complete stock of new and reconditioned parts for all cars and trucks. New jeep power units complete with radiators and stub shafts. Fast service.

PIONEER AUTO WRECKING CO.
732 W. 13th Ave. Denver 17, Colo.

EQUIPMENT FOR SALE

DRILLING equipment, reconditioned ready for delivery, Failing, Franks, Ell Tulsa, Longyear, American, Sullivan, Fort Worth, Wichita, Keystone, National, Standards. Also steel derricks, cable tools, cable and good used casing, most sizes. Pressey & Son, Pueblo, Colo.

FOR SALE: Wilson Super Model Winch powered by 6 MZR Waukesha engine. Terms. Melton Supply Company, Seminole, Oklahoma.

FOR SALE: Three Ideco Winches, practically new. Suitable for 8000' well servicing. Terms. Melton Supply Company, Seminole, Oklahoma.

350 new 12-inch Victaulic couplings—bargain. 3—6' x 20' 1¼ inch shell welded storage tanks. The American Pipe & Supply Co., 3403 Brighton Blvd., Denver 5, Colorado.

THREE New HBI 600 Cummins diesel engines, $2,650.00 each; and one new six MZRU Waukesha engine, $800.00. Subject to prior sale. Box C-548, The Oil and Gas Journal, Tulsa, Oklahoma.

EXTRA good 5½ Keystone Joplin special Trailer mounted 8.25 dual tires. Air brakes, nearly new International motor. Lots of tools. 10" down. Good lines. L. C. Williamson, Pritchett, Colo.

FOR SALE: 1 Model #36-L Bucyrus-Erie Spudder; 1 Model #350 Jumbo-Buster drawworks. F. D. Bridges, 1109 Euclid, Oklahoma City, Oklahoma. Phone 3-7810.

ONE doubledrum skidmount pipe pulling winch. 4,000' ¾" line capacity. Jerkline and cathead attachment. White motor powered. One 1943 GMC six-by-six truck equipped with winch. All in A-1 condition. Biehl Producing Co., 108 Seventh St., Marietta, Ohio. Phone 1075-M.

FOR SALE: 3300 ft. used 6⅝" 25.20# SIUE Drill Pipe, Range 2, with API Regular Tool Joints. Good condition. The National Supply Company, Fort Worth, Texas.

FOR SALE

2—125 H. P. 350# Working Pressure "Oil Well Boilers," excellent condition. Completely reconditioned. Not used since last approved by State Boiler Inspector. Priced to sell.

POWELL BRISCOE, INC.
1916 First National Bldg.
Oklahoma City, Oklahoma

FOR SALE—BUDA MOTORS

Two Buda Engines Model PC 1879 225 H.P. 6 cylinder natural-gasoline-butane, bore 6¾" stroke 8¾". Displacement 1879 cu. in. Engine complete with starting motors less clutches. Engines seen very little service and completely overhauled with new engine guarantee. Price $4250.00 each. F.O.B. Odessa.

WESTLUND-JOHNSON DRILLING CO.
811 Midland Tower
Midland, Texas

COMPLETE PUMPING UNITS FOR SALE

6—Superior VDMB, 260 hp., 600 r.p.m. diesel engines with Farrel 600/3600 r.p.m. speed increasers and Goulds 760 g.p.m., 1050 ft., 4"-4 stage centrifugal pumps.

Completely overhauled and guaranteed.

TAMPA ARMATURE WORKS, INC.
P. O. Box 1318, Tampa, Fla.

EQUIPMENT FOR SALE

FOR SALE: Brand new 28 L Bucyrus-Erie Spudder, Caterpillar Diesel motor. Casing strut, 8.25 tires, with or without tools. Jack Read, Scottsville, Ky. Phone 385.

FOR SALE: 25,000 ft. used 4½" Drill Pipe suitable for Line Pipe or Casing. The National Supply Company, Fort Worth, Texas.

SULLIVAN 22 H.D. CORE DRILL. Practically new. N-2 hydraulic swivelhead. R. B. McElwaine, P.O. Box 127 Little Rock, Ark.

FOR SALE: 1—U-15 Unit Draw Works powered with General Motors #671 Diesel Engines, Model FXQ 7¾ x 16 Gardner-Denver Power Pump, 17½" G. B. Oil Bath Rotary Table, Ideco Stream Line Swivel, 1—4125 B. J. Super Tri-Plex Rotary Hook, 1—127-foot Lee C. Moore Contilever Mast, 7500 feet—4½" O.D. 16.16# Grade "E" Drill Pipe, 1—7½ KW Thyrite Generator, complete with all accessories, Line Pipe, Fittings, Tools, etc., to fit Rig up complete. Inventory and prices on application. Rig can be inspected while in operation. H. A. McCarthy, 310 Thompson Building, Tulsa, Oklahoma, Phone 5-3296.

PIPELINE Construction Equipment for Sale: Pipe cleaning machine with priming head, traveling or stationary, 6" to 12", excellent condition, $1,350. Two T40 International tractors with pipelayer attachments, good condition, very cheap. Contact C. W. Sternberg, 8250 Wier Drive, Houston, Texas. Phone Preston 7043.

FOR SALE: Pump and well drilling business. Rotary drill, semitrailer mounted with tool house, tools J. V. Lindsey, Texline, Texas.

FOR SALE: Sullivan Model 200 Core Drill with Buda motors and Gardner Pump, little used. Box C-568, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 110 Cleveland Trencher and Trailer, almost new. Lewis Stucker, 918 N. Market, Wichita, Kansas. Phone 5-6397.

FOR SALE: Four LPG products storage tanks, 500 barrel capacity. $4,000.00 each. One radial drill press used six months. $1,200.00. Tri-State Supply Company, Mt. Pleasant, Texas.

USED Le Roi 6-, 8-, and 12-cylinder gas engines, complete and in A-1 condition for oil industry power. Priced to sell. Also one Model NKU Waukesha $1500. Write or call today. General Machine & Supply Company, P. O. Box 72, Wichita Falls, Texas.

EQUIPMENT WANTED

WANTED: Small mounted trenching machine. Keystone Pipe & Supply Company, 902 Burk Burnett Bldg., Fort Worth 2, Texas.

WANTED: PROPANE STORAGE TANK, also Propane unloading pump or compressor. Give specifications, condition, price & shipping point. Central Development Company, Aylmer, Ontario, Canada.

WILL buy "drilling in" unit or spudder, with or without tools, capable 4,000 to 6,000 feet. Also old wells for salvaging. Give price, location and pertinent particulars in first letter. Box 435, Lawrence, Kansas.

HELP WANTED

MAJOR Oil Company wants graduate construction or mechanical engineer under 40 years old having experience large tankage operations and pumping equipment. Headquarters Tulsa. Box C-561, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER

Experienced graduate petroleum engineer to supervise field operations with production department of independent refinery on Texas Gulf coast. Must be between 28 and 35 years of age. Must have thorough understanding of drilling, well completion, and relative production problems. In reply submit complete education and experience record stating salary expected.

P. O. Box 1581, Corpus Christi, Texas

HELP WANTED

WANTED: Married man with 10 years or more of drafting room experience in the design of welded pressure vessels for oil industry use. Must be able to organize drafting department to produce shop drawings, both for production items and tailor made orders suitable for practical shop fabrication practices. Job is permanent as chief drafsman. Adequate beginning salary plus year-end bonus and company paid trust fund participation. Location: Tulsa, Oklahoma. Box C-560, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL Industry Employment Service, 319 Castle Bldg., Tulsa, Okla. Tom Robinson, Mgr., Phone 4-5974. No fees to pay. Foreign service in Persian Gulf area. Needed now: Production and Petroleum Engineers $450 to $650. Meter and Regulator Engineer $425. Rotary drillers $480. Combination cat-truck drivers oilfield experience $420. Room, Board, Laundry, Medical care furnished. All must be experienced. Write for details.

WANTED
OPERATOR, REFINERY AND CHEMICAL PLANT

Must have operating experience, be able to prepare operating instructions, prepare schedules for plant start up and plant shut downs and have knowledge of plant processes. Must be able to handle labor problems. Should have equivalent to five or six years experience in operations.

Box C-571, The Oil and Gas Journal, Tulsa, Oklahoma

PURCHASING AGENT

Expanding, independent company engaged in all phases of oil and gas business on Texas Gulf Coast wants individual to take full responsibility for new department being set up to handle purchase, maintenance of inventories, and recording of all pipe, valves, fittings, drilling equipment and plant equipment. Salary commensurate with experience. Reply: Box C-528, The Oil and Gas Journal, Tulsa, Oklahoma.

United Geophysical Company, Inc.

595 East Colorado Street

Pasadena 1, California

offers employment to experienced Gravity and Seismic

Party Chiefs

Seismologists

Computers

Observers

in both North and South America and the Middle East

ENGINEERING

During the next several months we will increase our Engineering Organization engaged in the design of Oil Refinery Plants and Power Plants. Location Cleveland, Ohio. The men we need should be qualified as draftsmen, designers, checkers or in higher engineering skills on design of piping, instrumentation, pressure vessels, structural steel, concrete, mechanical or electrical. For presenting your qualifications and prompt consideration, write to us for application form.

ARTHUR G. McKEE & CO.

2300 Chester Ave., Cleveland 1, Ohio

HELP WANTED

EXPERIENCED Gravity Party Chiefs/Supervisors for foreign work. Best working conditions. Excellent opportunity for advancement. Salary $7000.00 to $8000.00 per year. Family living allowance. Only men of exceptional ability need apply. Our personnel have been notified of this ad. Box C-464, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Process Engineer—With Several Years' Experience—for Oklahoma Refinery. Send full particulars on education, experience and salary expected. Box C-511, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: OIL FIELD MECHANIC—experienced Diesel and Gas engines—heavy equipment. House furnished in yard at Hobbs, New Mexico. Apply by letter stating experience and references. Makin Drilling Company, Box 131, Hobbs, New Mexico.

LAND MAN with executive ability for large operating company in Mid-Continent. Must be familiar with developments and land work in Texas. Replies will be confidential. Our qualified employes are aware of this ad. Box C-517, The Oil and Gas Journal, Tulsa, Oklahoma.

WELL established growing independent located in the Rocky Mountain Region needs a graduate production engineer with several years experience. Need not be experienced in, but must be capable of undertaking reservoir studies. Part of time will be devoted to drilling and production operations. Complete information is desirable with first letter. C-543, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

EXPERIENCED CHEMICAL ENGINEER has had seven years experience in gasoline plant operation and research pilot plant supervision. Now employed. Desires work in plant operation. Box C-546, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED OIL EXECUTIVE
GRADUATE PETROLEUM ENGINEER, 40 years old, 15 year administrative background in organization, planning, and direction of production, drilling, and pipeline operations. Good knowledge of geology. Sales, purchasing, materials control and trading experience. Presently employed in supervisory position, Gulf Coast, desires to make connection as executive assistant to manager of substantial and aggressive independent oil company with future. Gulf Coast, West Texas or Rocky Mountain areas preferred. Box C-562, The Oil and Gas Journal, Tulsa, Oklahoma.

MECHANICAL Engineer, 25 years experience chemical and metallurgical plant design and construction. Presently employed as chief engineer. Desires change to west or southwest—position executive capacity. Box C-564, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM GEOLOGIST: 28, married, five years with major company with experience in surface and subsurface work in Rocky Mountains and Illinois Basin desires position on the East Coast, preferably in or around New York City. Box C-565, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST — Well rounded experience with major company. Capable; alert, desires more opportunity than present connection affords. Will consider any location. Box C-535, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM CHEMIST, B.S. 1940, with seven years experience in Petroleum products. Including supervising of Petroleum testing and C.F.R. engine operation, also oils and diesel fuels. Married, family, 33. Available immediately. Box C-567, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM Geologist experienced with sample examinations, structural interpretations, mapping of assembled data and reports on local or regional geology desires connection with independent oil or drilling company located in Tulsa. P. O. Box 1884, Tulsa, Okla.

PRODUCTION SUPERINTENDENT: 20 years experience, all phases of production and exploration, Oklahoma and North Texas. Technical background. Box C-566, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

GRADUATE CHEMICAL ENGINEER, 26, alert, personable. Two years designing, cost estimating heat transfer equipment, pressure vessels for petroleum industry. Desires permanent position in petroleum refinery operation, engineering, with progressive organization. Opportunity to demonstrate capabilities paramount. Location immaterial. For complete resume, Box C-572, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE engineer, age 30, veteran, one year experience in chemical laboratory and pilot plant operation, desires position with opportunity. Any location considered. Available immediately. Box C-573, The Oil and Gas Journal, Tulsa, Okla.

EXPERIENCED lease man with car, available for leasing, blocking of wildcat acreage or procuring title requirements. Best of references. Will go anywhere. Robert Galbreath, Jr., 2808 South Cincinnati Ave., Tulsa, Oklahoma. Phone 4-9548.

LEASE AND DRILLING BLOCKS

"WILD-CATTERS" Development Company organized New Mexico 1928. Large holdings exceptional merit, desire capital interested in drilling blocks shallow and deep. Farmouts, or assist our operations. Contact Cecil S. Ringle, 3433 Purdue Place, Albuquerque, New Mexico.

FOR SALE: 12 barrel settled production on 120-acre lease. Depth 325 to 450 feet. Many more good looking locations yet to drill. W. P. Harley, Bowling Green, Kentucky.

WANTED
Will buy producing leases and producing royalties in Texas and Louisiana. R. J. Grant, 128 Main Plaza, Apartment 424, San Antonio 5, Texas.

TENNESSEE—80,000 acres; fee $3 per acre; liquidation; est. 100 miln ft. timber; full mineral rights, details E. Jester, 12744 Vanowen, N. Hollywood, Calif.

WANTED—Principal to participate with us in the drilling of a test well on a large block of leases in Oregon. Write Ervin Kroker, Camas Valley, Oregon.

FOR SALE: Oil and Gas Leases and Production in shallow territory. We do drilling and furnish equipment for wells; also look after shooting and equipping. W. P. Harley, Bowling Green, Kentucky.

FOR LEASE on ⅛ basis for test drilling 100,000 acres of untested Cumberland Plateau land by owner. One test hole found 5 veins of coal aggregating 41 feet. G. E. Harrison, Crossville, Tenn.

HAVE been offered $35,000 for a ⅝ interest in my oil and gas structures in North-Central Tenn., the money to be used to drill four test wells thereon. I will give a ½ interest therein for that amount and for that purpose. N. M. Sauls, Geologist, Cookeville, Tenn

NEW large drilling block, 7 wells in. Big gas and oil found. Sale for gas to nearby pipeline. 1,000 to 5,000 acres ready to drill on structure. Gerhardt and Gerhardt, Geologists, New Berlin, Ill.

HAVE 800 acres. Offsetting well flowing 23 bbls. per day after 23 years, 41 gravity oil, no water. Approx. 4,000 feet. Excellent sub-surface geology, Central Texas. Want development. Box C-569, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Producing oil lease, 480 acres Osage County, Bartlesville Sand. Gas repressuring plant. Production 12 bbls. daily. Six-room modern lease house. E. E. Shannon, Box 631, Sedan, Kansas. Phone 154.

LEASES ROYALTIES
PRODUCING OR NONPRODUCING
Texas, New Mexico, Oklahoma, Louisiana and Illinois.
Inquiries Invited
B. D. BUCKLEY
60 Broadview Drive, Clayton (5), St. Louis, Missouri

LEASE AND DRILLING BLOCKS

1920 ACRE lease adjoining Major Co. block with four shut-in gas wells. 3200 ft. depth. Excellent prospect. Want development. S. A. Hole, Shelby, Montana.

LEASES: Proven, semi-proven, and wildcat in Campbell, Crook, Laramie, Goshen, Albany, and Platee Counties, Wyoming. Large drilling blocks or 40-acre tracts, priced to sell. These areas are scheduled for considerable exploratory development by major companies. Box 382, Cheyenne, Wyoming.

ROYALTIES

ANDREW J. BARRETT
The Philtower
Tulsa, Oklahoma

DEEDED ROYALTIES
San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington, New Mexico.

WE will buy producing or non-producing oil royalties. Send particulars. Standard Security Company, 115 Broadway, New York 6.

FLORIDA—Fully participating, perpetual minerals, under 50c major leases, in popular east coast county. Address, Box 2191, Orlando, Florida.

BUSINESS OPPORTUNITIES

FOR SALE: Fully equipped Oil Field Machine Shop. Two portable welding trucks. Good location, good business. Priced to sell. S.R.S Machine and Supply Company, Box 824, Thermopolis, Wyoming.

WANTED: Sportsman or Group for financial backing of year round sports development at Santa Fe, New Mexico. Skiing, skating, tobogganing, private chalets, perfect summer retreat with fishing, hunting, horses, etc., all at entrance to Pecos Wilderness area. Complete plans prepared by experienced and registered engineer with proven record of winter sports development who wishes to operate and manage this project and who has material and equipment available for winter sports operation this winter. This will stand a full and complete investigation but it's not for the "Small Fry." Write direct to Charles L. LeFeber, 313 North 15th St., Albuquerque, New Mexico.

PATENT ATTORNEYS

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell, Registered Patent Attorneys, Suite 418, 815-15th Street, N.W., Washington 5, D. C.

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1908. Oil-Gas (all states), Business, Real Estate, Legal Forms, Leases, Revised With Government Regulations, Commercial Printing, Catalog and Samples on request. Burkhart Printing & Stationery Company, 118 South Cincinnati, Tulsa 3, Oklahoma.

REAL ESTATE

MOVING TO HOUSTON?
Warehouse and Office Building on Supply House Row; Lease—$150/Month. J. N. Yeager, 602 Citizens State Bank, Houston 2, Texas.

FOR SALE

TRUCK LETTERING AND TRADEMARK DECALS made for your trucks and equipment. Easy to apply, uniform, distinctive, economical for small or large needs. Write for catalog. MATHEWS COMPANY, 827 S. Harvey, Oak Park, Illinois.

PERSONAL

Application for Membership in the Diesel Engineers International Assn.
576 Newark Ave., Jersey City, N. J.
Name .....
Address .....
Reference .....

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CALENDAR

September

American Chemical Society, Division of Petroleum Chemistry, fall meeting, St. Louis, September 6-10.

National Tractor and Diesel Engine meeting of the Society of Automotive Engineers, combined meeting, Hotel Schroeder, Milwaukee, Wis., September 7-9.

The Instrument Society of America, third instrument conference and exhibit, Philadelphia Convention Hall, Philadelphia, September 13-17.

Pacific Coast Gas Association, annual convention, Hotel Casa del Rey, Santa Cruz, Calif., September 14-16.

American Petroleum Institute, Lubrication Committee, Hotel Traymore, Atlantic City, N. J., September 15-17.

National Petroleum Association, Hotel Traymore, Atlantic City, N. J., September 15-17.

Oklahoma Utilities Association, Gas Division, annual conference, Biltmore Hotel, Oklahoma City, September 17.

National Association of Corrosion Engineers, South Central section, Tulsa Hotel, September 20-21.

National Butane-Propane Association annual convention and trade exhibit, Congress Hotel, Chicago, Ill., September 20-22.

Independent Petroleum Association of America, annual meeting, Plaza Hotel, San Antonio, Tex., September 27-28.

October

American Society of Mechanical Engineers, petroleum division, Herring Hotel, Amarillo, Tex., October 3-6.

American Institute of Mining & Metallurgical Engineers, petroleum division, fall meeting, Adolphus Hotel, Dallas, October 4-6.

American Association of Petroleum Geologists, midyear meeting, technical session and 3-day field trip, William Penn Hotel, Pittsburgh, Pa., October 4-9.

American Gas Association, thirtieth annual convention, technical section, and exhibition of the Gas Appliance Manufacturers Association, Ambassador Hotel, Atlantic City, N. J., October 4-8.

California Natural Gasoline Association, twenty-fourth annual fall meeting, Ambassador Hotel, Los Angeles, Calif., October 8.

National Lubricating Grease Institute, sixteenth annual convention, Edgewater Beach Hotel, Chicago, October 11-13.

American Association of Oilwell Drilling Contractors, eighth annual meeting, Rice Hotel, Houston, October 11-13.

Texas Mid-Continent Oil and Gas Association, twenty-ninth annual meeting, Fort Worth, October 14-15.

American Institute of Mining and Metallurgical Engineers, petroleum division, Elks Club, Los Angeles, Calif., October 14-15.

Natural Gasoline Association of America, regional meeting, Exhibit Hall at the fair grounds, Shreveport, La., October 15.

Natural Gasoline Association of America, southern regional meeting, Washington-Youree Hotel, Shreveport, La., October 15.

Measurement and Control Instrument Exposition, sponsored by the Southern California Meter Association, Municipal Auditorium, Long Beach, Calif., October 22-28.

Independent Natural Gas Association of America, annual meeting, Mayo Hotel, Tulsa, October 26.

Third annual short course on "Instrumentation for the Process Industries," Texas A. & M. College, College Station, Tex., October 26-28.

November

American Society of Mechanical Engineers, fuels division, Greenbrier Hotel, White Sulphur Springs, W. Va., November 3-4.

Society of Automotive Engineers, fuels and lubricants division, Mayo Hotel, Tulsa, November 4-5.

American Petroleum Institute, annual meeting, Stevens Hotel, Chicago, November 8-11.

December

Natural Gasoline Association of America, regional meeting, Amarillo, Tex., December 3.

January 1949

Society of Automotive Engineers, annual meeting, Book-Cadillac Hotel, Detroit, Mich., January 10-14.

March 1949

New England Gas Association, Hotel Statler, Boston, March 24-25.

Western Petroleum Refiners Association, thirty-seventh annual meeting, Plaza Hotel, San Antonio, Tex., March 28-30.

American Chemical Society, division of petroleum chemistry, spring meeting, San Francisco, March 27-April 1.

April 1949

Southwestern Gas Measurement Short Course, University of Oklahoma, College of Engineering, Norman, Okla., April 12-14.

National Petroleum Association, Hotel Cleveland, Cleveland, Ohio, April 13-15.

Natural Gasoline Association of America, annual meeting, Texas Hotel, Fort Worth, April 20-22.

NOMADS

Houston Nomads, second Monday of each month, The Houston Club, Houston.

Los Angeles Nomads, second Wednesday each month, Jonathan Club.

New York Nomads: Golf party, Sept. 21, at Baltusrol Country Club, N. J.

California Fields

(Continued from page 133)

ft., base Macoma 2,839 ft., top Chanac 2,839 ft., TD 3,435 ft.

Monterey County, Salinas Valley area: The Texas Co. 1 Labarere One, 25-23s-10e, dry, elev. 605 ft., TD 3,771 ft.

Orange County, Olive area: British-American Oil Producing Co. 1 Fluor, 24-4s-10w, dry, elev. 165 ft., TD 4,518 ft.

San Luis Obispo County, Arroyo Grande area: Macoil Corp. 1 Miossi, 34-31s-12e, dry, elev. 340 ft., TD 2,089 ft.

Cuyama Valley area: Peak Oil Tool Service Co., Inc., 1 Stone, 16-11n-28w, dry, elev. 1,808 ft., TD 1,715 ft.

Richfield Oil Corp. 1 Victoria Wood, 9-10n-28w, dry, elev. 2,470 ft., TD 3,925 ft.

Solano County, Kirby Hills area: Shell Oil Co., Inc., 4 Lambie, 30-4n-1e, dry, elev. 20 ft., TD 6,380 ft.

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